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THE MEN OF THE BARMA-GRANDE

(BAOUSSÉ-ROUSSÉ)

IMPRIMERIE MODÈLE - MENTON

THE MEN OF THE BARMA-GRANDE

(BAOUSSÉ-ROUSSÉ)

AN ACCOUNT

OF THE ANTHROPOLOGICAL AND ARCHÆOLOGICAL SPECIMENS

IN THE

MUSEUM PRÆHISTORICUM

FOUNDED BY THE LATE SIR THOMAS HANBURY

K. C. V. O., F. L. S., ETC.

NEAR MENTONE

TRANSLATED FROM THE FRENCH OF

Le Docteur R. VERNEAU

By O. C. & B. C.

SECOND EDITION

PUBLISHED BY FR. ABBO

BAOUSSÉ-ROUSSÉ, NEAR MENTON.

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THE MEN OF THE BARMA-GRANDE

(BAOUSSÉ-ROUSSÉ)

PREFACE

TO THE SECOND EDITION.

Since the appearance of the first edition of this little work, important discoveries have been made at the Baoussé-Roussé. These discoveries would seem to have solved certain questions which were formerly the subject of much discussion. I refer to the finds for which science is indebted to the Prince of Monaco, who had three of the caves completely excavated, viz the Children's Cave, the Baousso da Torre, and the Prince's Cave. These excavations were carried out under the direction of le Chanoine L. de Villeneuve, assisted by M. Frederico Lorenzi, and were performed so skilfully and systematically as to win the approval of scientific men. The results obtained were quite unexpected. Not only have they enabled us to determine with certainty the age of the several layers containing the remains of man or the relics of his handiwork, but they have revealed the existence of a fossil human type hitherto unknown.

Some of the results obtained by these excavations hold good for the neighbouring caves; for all these caverns bear a close resemblance to one another, the Barma-Grande, in particular, corresponding closely with the Children's Cave in the sequence of the layers, in the fauna, and also in the implements, etc. The discoveries made in this latter cave enable us to determine much more accurately than hitherto the period to which the skeletons belong which M. Abbo found in 1892 and the following years.

When, therefore, I learnt that the first edition of "The Men of the Barma Grande" was exhausted, I decided to revise my original work. I cannot pretend to have solved all the controverted questions even in this present edition, but I feel assured that owing to the fund of new information we now possess, we are in a position to give a very complete account of the troglodytes of the Baoussé-Roussé.

Paris, January 1908.

FOREWORD.

The discoveries which have been made during the last half century in the caves of the Baoussé-Roussé, have attracted the attention of the scientific world. Even ordinary tourists have been interested by the prehistoric remains in stone, bone, shell, etc, which the excavations brought to light. The unearthing of the first human skeletons caused a sensation ; but they were removed to a distance and their memory alone remained at the Rochers-Rouges, though a skull and a few human bones, together with the remains of animals, and some primitive implements, found their way to the Museum of Mentone where but few people go to see them. These remains were dug out of the Barma-Grande in February 1884 by M. Julien, and at various times by M. Bonfils.

Most people who now visit the Côte d'Azur make an excursion to the Baoussé-Roussé to view the remains of the prehistoric men found in these caves. For the excavations carried on by M. Abbo without intermission since February 1892, have resulted in the discovery of five more skeletons which have been left on the spot. Many relics of primitive handiwork found in proximity to the human bones, or at a lower level, show us what the ancient inhabitants of the Mediterranean coast were cap-

able of doing. But the importance of these finds was fully appreciated only by a small band of scientific specialists, and although a few amateurs may have derived some profit from their excursion to the Baoussé-Roussé, it must be admited that most of the visitors, who were unversed in prehistoric lore, went away without gaining much information. There was no convenient handbook to explain to them the interest of the objects upon which they gazed. Works relating to the Rochers-Rouges are comparatively numerous; but they consist of scientific papers scattered through a mass of publications, which are not always easy of access, or of large volumes which would take long to read.

Thus I thought that a small work on the subject would be found useful by those visiting the caves of the Rochers-Rouges, and the Museum where all M. Abbo's finds in the Barma-Grande are collected; for, thanks to the generosity of the late Sir Thomas Hanbury, a building has been erected close to the cave, on the front of which is the inscription : *Museum Præhistoricum*. (Fig. 1) This contains all the objects dug out since 1892 by M. Joseph Abbo, and they form a most interesting collection.

Sir Thomas Hanbury, who died last year, was well known to all visitors to the Riviera. After a long sojourn in China, he purchased

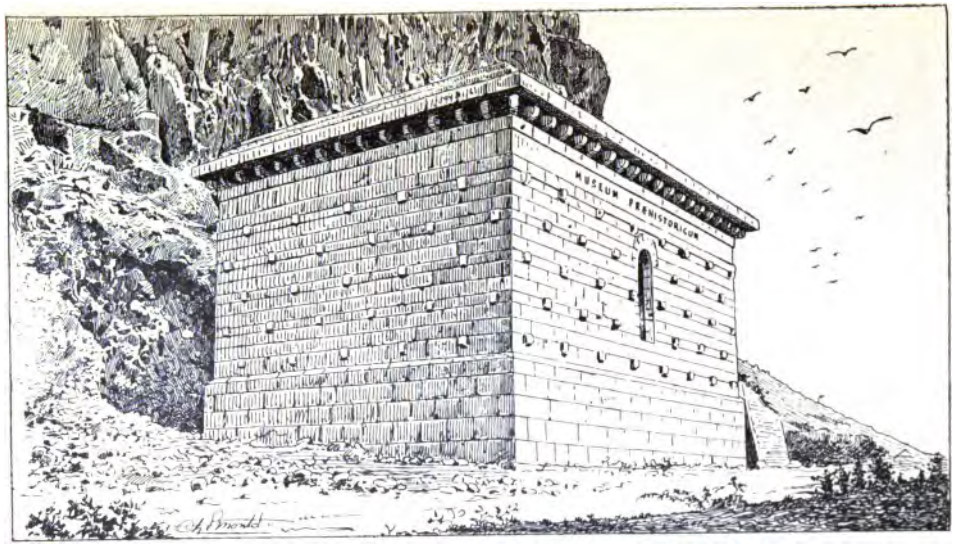

FIG. 1 — The Museum Præhistoricum at the Baoussé-Roussé.

in 1867 a large estate at La Mortola, which lies halfway between Mentone and Ventimiglia. There he made a magnificent botanic garden, which now contains more than 4,000 species of plants all grown in the open air, and coming from all parts of the earth : from China, Japan Egypt, the Canaries, Mexico, California, etc. Seeds are also constantly distributed to and exchanged with the Botanic Gardens of the world. The residence, the Palazzo Orengo, which stands in the middle of the garden is quite a museum.

Not only did Sir Thomas Hanbury create this lovely pleâsaunce, but he built schools for the children of the neigbouring villages and presented to the town of Mentone a fountain erected at the end of the Boulevard Garavan, opposite the tram station. (1.) He was therefore naturally interested in the archæological discoveries that were being made so near his home, and realising their importance encouraged M. Abbo to continue the excavations. It is therefore fitting that we should honour the memory of a man who was thus instrumental in preserving these priceless relics of prehistoric times.

Since then a sovereign, who is moreover a

(1) Among other munificent deeds he erected a fine building for the Botanical Institute at Genoa, and presented an estate at Wisley to the Royal Horticultural Society. (Translators' Note).

well-known scientific man — Prince Albert I of Monaco —, has carried out in other caves of the Baoussé-Roussé the systematic excavations to which I have already alluded, and which have been so fruitful in results. The specimens he unearthed have been arranged and classified in the *Musée Anthropologique* of Monaco, which was built especially for them, and where they may be seen. This little book will be found equally useful by visitors to that museum.

It would have been easy to write a much larger volume about the men who lived at the Rochers-Rouges, as I have ample data. For since February 1892, a few days only after M. Abbo discovered the first skeleton in the Barma-Grande, I have been entrusted with the task of examining all the remains unearthed there. And from that time I have made numerous visits both to the Baoussé-Roussé and to Monaco in order to complete my investigations. At Prince Albert's request I undertook to describe the anthropological collections brought together there under his auspices; and after having read nearly everything that has been printed on this subject, I have myself published several memoirs, as well as a more complete work, which contain the results of my studies. It seemed to me, however, best in this instance to write a short pamphlet, omitting the details which specialists will easily find elsewhere.

I thought it might be useful to preface my present work with an introduction containing a sketch of the geological epochs, and of prehistoric man, in order to make the book more intelligible to the general reader. For the sake of brevity I have condensed, as much as possible, the information that we possess about the caves of the Rochers-Rouges, and specially about the Barma Grande. Finally, with the object of enabling even those who have but little leisure to gain an idea of the interest of these discoveries, I have concentrated into the few pages forming the last chapter, all the facts mentioned in the preceding chapters; and I have endeavoured to show what conclusions may be deduced from these facts.

The first edition contained numerous woodcuts, and this volume is still more copiously illustrated: we hope that these figures will help the reader to understand the text. May this work, in its present form, be of use to those who are interested in the history of man and be as well received by the public as was its predecessor.

INTRODUCTION

1. — The Earth's History and the Geological Epochs.

It is now well known that the earth was not always in its present condition. Astronomers believe that it originally formed an incandescent nebulous mass, which, gradually shrinking, became a brilliant star. Cooled by radiation, this star became changed into a fluid sphere and ceased to shine by its own light.

At this stage our planet was enveloped in an atmosphere saturated with aqueous vapour: and as its temperature was not less than 1,500 C, all substances which are gaseous at that temperature formed part of the atmospheric envelope.

In the fluid mass which thus resulted the different elements were arranged according to their specific gravity, the lighter at the surface the heavier towards the centre. As the temperature still further diminished, the lighter substances were the first to solidify, forming a thin and unsubstantial coating round the fluid sphere.

Once protected by this first pellicle against the heat radiated by the central mass which was still in a fluid condition, the vapours of the atmosphere condensed, and being precipit-

ated formed an ocean which covered the whole surface of the globe.

The original crust cooled down and, as a result of this refrigeration, diminished in volume. Simultaneously the fluid kernel which it imprisoned also contracted, and that more rapidly than the crust. Owing to this shrinkage of the central mass, the crust, being left without support, became folded : depressions were formed, and in these the waters of the ocean were collected. Those parts which remained exposed constituted the primitive continents which consisted entirely of crystalline and laminated rocks.

Geologists, finding no fossils of plants or animals in these earliest formations, concluded that the chemical and physical conditions then prevailing were incompatible with animal and vegetable life. Hence the term *azoic*, or lifeless, applied to this epoch. Recent discoveries however point to the existence of certain elementary organisms whose remains have disappeared under the influence of the heat given out by the incandescent mass not far below the surface.

As soon as the primitive continents emerged, the rocks composing them became exposed to the erosive action of the waves and rain and to the disintegrating influences of the atmosphere. The detritus which resulted from this process of denudation was carried away by rivers and

deposited in the sea. And as the ocean gradually cooled, the various substances held in solution or in supension were precipitated. Thus were formed those earliest sedimentary strata which go by the name of *primary*. The sea-water, purified and reduced in temperature, became the scene of organic life, and on the newly-formed land certain lowly plants and animals arose.

This second Geological period is in reality from the point of view of palæontology the first, and it is commonly known as the *primary* or *palæozoic age*, that is to say the epoch of ancient animals. These first animals were invertebrate. Later on, towards the close of the palæozoic age, fishes made their appearance, and also a few quadrupeds. Birds and mammals came later.

The temperature continued to diminish, and the thickness of the earth's crust was increased, firstly from within by the solidification of the fluid mass, secondly from without by the deposit of fresh layers on the surface. During this, the so-called *secondary age*, the earth passed through a period of comparative calm. The outlines of the continents had undergone important modifications, but volcanic action had not yet produced lofty mountain ranges. The conditions of existence being changed, the fauna and the flora differed from those of the preceding epoch. Animals were more highly

developed : the reptiles attained extraordinary dimensions, some of them measuring as much as 75 feet in length.

About the middle of the *secondary* or *mesozoic age*, that is to say the epoch of intermediate animal life, the first bird made its appearance. This, the *Archæopteryx*, was a winged creature related to the reptiles by its teeth and claws and long tail, but feathered like a bird, and resembling a bird in the formation of its hinder parts. At the same time there appeared certain small and lowly organised mammals closely related to the marsupials.

In the next geological period the temperature, though steadily decreasing, was higher than at the present day. The plants and animals living in western Europe at this time belonged to genera now represented only in the tropics. But as the animals then bore considerable resemblance to those now existing, this Tertiary Epoch has been called *neozoic*, or in other words the age of recent animal types. The gigantic reptiles disappeared, birds became more numerous, and mammals abounded. Among these last were pachyderms resembling the tapir ; and large animals closely related to the elephant such as the *Mastodon* and the gigantic *Dinotherium* standing about 15 feet high ; also the rhinoceros, ruminants, and a kind of horse, the *Hipparion*, which possessed, besides the principal median toe, two rudi-

mentary lateral ones that did not reach the ground. There were also lemurs, predecessors of the true apes, not to mention other species. The conditions of life must therefore have approached more nearly to those of the present day. It was during this period that the principal mountain chains were elevated by volcanic action.

In the fourth or *Quaternary Epoch* the decrease in temperature became more marked ; glaciers appeared on the surface of the globe and advanced far in a southerly direction: hence the term *Glacial Epoch* often applied to this geological period.

The deposition of sedimentary strata was almost entirely arrested (1); but the detritus worn from earlier formations was carried elsewhere by running water and formed what is called *alluvium*. Meanwhile new types of animal and vegetable life were being added to those already existing or were replacing those which had become extinct.

At last the glaciers retreated ; the surface of the earth assumed its present configuration ; plants and animals of existing types were developed, and the *Recent Epoch* succeded the Quaternary, of which many geologists regard it as merely a continuation.

The phenomena which I have described took

(1) This theory is not accepted by English Geologists. (Translators' Note).

place gradually ; one geological epoch insensibly merging in the next.

Palaeontology enables us to determine the relative age of the different strata which make up the crust of the earth. It is easy to comprehend how the remains of extinct plants and animals were covered and preserved by later deposits. Thus when we find traces of organic life in strata which have not been disturbed we are able to infer the age of those strata. Those animal and vegetable remains which we find in the deposits of past geological periods are termed *fossils*.

II. — Antiquity of Man.

The simplest organisms having been the first to appear, and these having been replaced by others more highly organised, man, the most highly organised animal, must have been the last to appear.

To what period then shall we assign the origin of man ? This question has only quite recently arisen. Men were inquiring previously whether the creation of Adam and Eve had not been preceded by the creation of the gentiles : an inquiry which turned on the interpretation of very obscure biblical texts. However, in view of the discoveries which were being made on all sides it was impossible to deny that man must have existed before the dawn of history. In the

Kjokken-möddings (Kitchen-middings or shell mounds) of Denmark : in the *skovmoses* (peat-mosses, or submerged forests) of the same country : in the ancient Scandinavian tombs and among the piles which formerly supported the Swiss lake dwellings, proof was found of the existence of races which had lived at a very remote period.

The theory was gradually established that primitive man used bronze before iron for the manufacture of his weapons and tools; and that at a still earlier date, when the use of metals was unknown, stone implements were used instead. Moreover three stages were distinguished in the past history of humanity :

I. The stone age.
II. The bronze age.
III. The iron age.

But although the existence of man in prehistoric times was proved, no one thought of placing the date of his first appearance farther back than the beginning of the present geological epoch. Early in the 18th century human remains were discovered at Canstadt together with the bones of animals no longer existing in western Europe. In 1715 a gravel pit in England yielded some flint implements which had certainly been shaped by human hands. These were associated with the remains of an elephant. But no importance was attached to

these finds: a fact which need not surprise us when we consider that palaeontology, the science dealing with extinct forms of animal and vegetable life, did not yet exist.

At the beginning of the 19th. century numerous relics of human handiwork were found associated with the remains of extinct animals: nevertheless Cuvier, the great naturalist who founded the science of palaeontology, was unconvinced up to the time of his death (1832) of the existence of man in geological epochs earlier than the present.

Discoveries became more and more numerous. Among the scholars who had the greatest share in the advancement of this study of the antiquity of man the following may be mentioned: Boucher de Perthes, le Marquis de Vibray and Edouard Lartet. Fresh proofs accumulated in every direction of the co-existence of man with animals of the Quaternary Epoch; human remains being found in undisturbed deposits belonging to that period. In one place weapons were unearthed, in another flint implements which must have been the work of our ancestors: here again rude carvings or outlines, representing with so much fidelity the mammals of the Glacial Epoch that we are compelled to conclude that the artist was familiar with the aspect of these animals.

Elsewhere human bones were found side by side with those of extinct animals. At Les

Eyzies, Dordogne, Messrs Lartet and Christy met with the vertebra of a young reindeer pierced by a flint arrow-head which had remained fixed in the bone killing the animal: clear proof that man was contemporaneous with and hunted the reindeer in this district. In a word the evidence for the existence of man during the Quaternary Epoch, and even during the early part of that period, is so conclusive that no scientist thinks of doubting the fact.

Did man appear still earlier? Did he live during that Tertiary Epoch when so many other mammals were developed? At the present moment this question is much discussed. There are some who see signs of human agency in certain markings or incisions on the bones of tertiary animals: these, they think, were produced by a flint implement. Others regard these incisions as the marks left by the teeth of a carnivorous animal. Flints which some archæologists believe to have been worked by man, are thought by others to have been shaped accidentally, or to be more recent than was claimed. A Belgian scientist has collected from deposits of early quaternary date, and also from others undoubtedly tertiary, stones which, though not exactly worked, are chipped at the point or on the edges in such a way as to suggest that they were used by man. Our earliest ancestors, ignorant of the art of

shaping stones, may have used for certain purposes rough pebbles from which chips were struck off during use. These supposed primitive implements have been called *eoliths*.

But it appears from observations made at a cement factory near Mantes that chalk flints, striking against each other in the grinding machine, may acquire all the characters which distinguish the eoliths. Consequently we have a right to conclude that pebbles, when submitted to the action of torrents, may be knocked about and chipped in such a way as to present the appearance of having been used by man; and good geologists affirm that these supposed primitive implements are invariably met with in ancient torrent beds. Moreover it seems likely that certain flints, indubitably worked by man are less ancient than was supposed.

Thus it is that, notwithstanding my inclination to accept as a matter of theory the existence of man in the Tertiary Epoch, I am constrained to admit that the proofs are not absolutely convincing. It is wise therefore to await more conclusive evidence before making up one's mind.

It is quite possible, moreover, that the incisions and the implements which have been ascribed to human agency may have been the work of some creature intermediate between the higher apes and man. This hypothesis,

suggested some time ago by G. de Mortillet, Haeckel and Hovelacque, found few supporters. But now the investigation has made a step in advance, for the remains of a semi-human creature, the *anthropopithecus* as G. de Mortillet calls it, have been discovered in Java by Dr Eugène Dubois, a Dutch army-surgeon. He, following Haeckel, has called it *pithecanthropus*, or monkey-man, a term identical in meaning with that just mentioned.

III. — Subdivisions of the Quaternary Epoch.

The geological periods which preceded the present one were of long duration, and in order to study them more profitably they have been subdivided by geologists and palaeontologists. Although the Quaternary was short as compared with the earlier periods, it lasted a long time, some authorities say as much as 200,000 years. This is probably too high a figure; nevertheless we know that the climatic conditions were not uniform during the whole of this period; animal and vegetable types underwent modification, and human handiwork advanced so much that hundreds of centuries must have been required for the process of development. Clearly then, if we speak of Quaternary Man without further explanation, we are using an expression that is very vague.

In order to get rid of this vagueness attempts have been made to establish subdivisions of the Quaternary Epoch. Edouard Lartet proposed a classification based upon the predominance of certain animal types at a given time. These are his four divisions in order of antiquity.

1. Period of the cave-bear.

2. Period of the mammoth and woolly rhinoceros. (*R. tichorhinus*).

3. Period of the reindeer.

4. Period of the aurochs.

Each of these periods ends when its characterstic animal ceases to be found in the deposits.

Lartet's classification has a purely local value, but it applies fairly well to the South of France.

In his work "Le Préhistorique" G. de Mortillet gives a classification founded mainly on the character of the human handiwork, and as far as possible brought into harmony with the facts of geology and of palaeontology. It has obtained so much acceptance that I here reproduce in its entirety the table which he gives in his book.

Subdivisions of the Quaternary Epoch, by Gabriel de Mortillet.

NAME	CLIMATE	GEOLOGICAL FORMATIONS	VEGETABLE PALÆONTOLOGY	ANIMAL PALÆONTOLOGY	HUMAN HANDIWORK
Madeleine.	Cold and dry.	Red diluvium Atmospheric deposits.	Polar moss in Wurtemburg.	Man of the Laugerie Basse race. Great development of the northern fauna; reindeer, saïga. Disappearance of *Elephas primigenius.*	Drawing & engravirgs. Bone implements. Disappearance of stone. Many knives Characteristic graver. Double scraper.
Solvtré.	Mild temperature.	Relatively of very short duration. Terraces still forming. Glaciers recede.		Man? Horses very abundant Appearance of *Cervus tarandus, Elephas primigenius.* Rhinoceros disappears.	Appearance, towards the end, of bone implements. Highest development of stone implements. Spear-heads worked on both surfaces & at both ends, & notched. Origin & great development of scrapers.
Moustier.	Cold and damp.	Formation of terraces. Great extension of glaciers. Elevation of the ground.		Man of the Engis & Olmo races. *Ovibos moschatus, Ursus spelæus, Rhinoceros tichorhinus, Elephas primigenius.*	No bone implements. Division of the Chelles implement. Spear heads, scrapers, saws, worked on one side only.
Chelles.	Warm and damp.	Fluviatile loam or Lœss. Higher aluvium. Filling up of the valleys Sinking of the ground.	Plants of the Mediterranean basin in the valley of the Seine & of Canstadt.	Man of the Neanderthal & of the Naulette races. Appearance of deer, Hippopotamus, *Rhinoceros Merckii, Elephas antiquus* (pliocene form).	No bone implements. One tool, the Chelles, always of local stone.

Many faults have been found with this classification. But it does not pretend to do more than apply to N. France (Gaul), and is, moreover, provisional. In this table the Chelles is the most ancient and the Madeleine the most recent epoch.

In the following pages I have borrowed terms from Lartet's and also from de Mortillet's classification, both of which I have therefore reproduced.

IV. — Evolution of Human Handiwork during the Quaternary Epoch.

During the whole of the Quaternary Epoch man manufactured numerous stone implements of which not one is polished. Later, at the commencement of our present epoch, our ancestors still used stone for a great variety of tools ; but we find among these a certain number of implements which have been polished by being rubbed against another stone used as a "polisher". The Stone Age has therefore been divided into two periods.

1. Palaeolithic, or Ancient Stone Age, (implements chipped) ;

2. Neolithic, or Newer Stone Age (implements polished).

In neolithic times a great number of weapons and tools were still made by chipping, as

during the preceding period; but these can, for the most part, be distinguished by the difference in workmanship. When we speak of the chipped stone or Palaeolithic Age, we mean the period which corresponds to the whole of the Quaternary Epoch.

A. — In the earlier of these periods man fashioned his implements very crudely. By means of a *hammer-stone* (1) he struck off large flakes from a *core* or *nucleus*, and these flakes were very little "worked". If the flake was long and thin, with sharp edges, it was used as a *knife*; if it had a sharp point it was used to tip a wooden *lance* (2).

Fragments of gritstone, limestone and flint were worked along their edge in such a way as to thin it down; these became *scrapers*. *Discs*, the use of which it is difficult to explain, have been met with in deposits of this age. But by far the most characteristic implement is that which has been called the *hatchet*: this ought rather to be considered as a club. This hatchet is of a peculiar shape, being rather like an almond. It is "worked" on both surfaces, but coarsely, like all the implements met with at this level. G. de Mortillet thinks that many of these hatchets were used without

(1) We have endeavoured to harmonise these terms with those used by Lubbock, Evans, Pengelly, etc. (Translators' Note.)

(2) Other sharp tools, "worked" to obtain a fine point, have been called *borers*.

handles of any sort, and he has therefore called them *hand-axes* (coup de poing). Some of these are 10 inches long. A number were found in the Somme, particularly at Saint-Acheul; later an important find was made near Paris in the gravel-pits of Chelles; whence we derive the terms "*acheuléenne*" and "*chelléenne*" which distinguish this first period.

B. — In the next period, that of "Moustier", all the stone implements are still coarsely worked. Man continued to use the *hammèrstone*; he still made *knives* (lames), *discs*, *scrapers* and *borers*, very similar to those of the Acheul period. Certain scrapers are notched in such a way as to suggest their use as *saws*. But the almond-shaped hatchet becomes rare. This club is replaced by a narrow *lance-head* which was well suited to its purpose because of its slender form. When our ancestors first began to shape stones they must certainly have obtained triangular flakes with sharp points, which they tied to the ends of sticks. Having discovered the advantages of a weapon of this kind they almost entirely gave up the club of the type of Saint-Acheul and turned their ingenuity to the manufacture of the deadly lance-head. To give these greater penetrating power they often thinned them down by removing fine flakes from the edge.

In the Moustier period man began to use bone splinters and "splint-bones" of horses

to make a kind of *drill* or *awl*. This was fashioned simply by scraping or wearing down one end.

C. — With time and experience the skill of the stoneworkers developed remarkably. The *hammers*, *knives*, *lance-heads*, the *scrapers* and the *borers* of the preceding period were still used. These implements show better and better workmanship, but they remain fundamentally the same. At Solutré we see the appearance of a new type of tool, the *round-ended scraper*. This is an elongated blade of flint with more or less parallel sides, one end of which has been chipped so as to obtain a convex bevel edge. Still more characteristic of the workmanship of the Solutré period is the large *lance-head* in the form of a laurel leaf, worked on both surfaces with a skill not easy to imagine if one has not seen the object. Some of these are nearly 12 inches in length with a maximum thickness of 4 inches. A few smaller *lance-heads* show quite as much skill, especially those which have a notch at the base. The barbs thus formed rendered the weapon very deadly, for once the spear had entered an animal's body it was held by them. Finally, in this period, flint *gravers* occur. These must have been used to work bone objects, (drills, whistles, etc) a considerable number of which were met with at Solutré. They may also have served to outline the rough engravings found there.

D. — At La Madeleine, and in the other localities where flint implements of the same period have been found, these are less highly finished than at Solutré; nevertheless they exhibit great skill, remarkable firmness of workmanship, and above all a high degree of intelligence. The artificer seems to have produced without the least difficulty whatever implement he required. The *knives* resemble those of the preceding periods: the *round-ended scraper* hitherto rare, becomes very abundant: it is carefully worked at its wider end. We find *saws*, *borers* with the point very finely chipped, and numerous *gravers*. Some of these implements were intended for working bone or reindeer horn. This animal abounded in certain districts, and was hunted not only for its flesh and its skin but also for the sake of its antlers. These were found most useful for the manufacture of numerous objects such as *lance-heads* and *arrow-heads*, some cylindrical and pointed at one end only, others barbed at one or both sides. The shape and number of the barbs are infinitely varied. From reindeer horn these ancient hunters made small curved spindles, which they tied by the middle and used as *fish-hooks*. The same material served for their *harpoons*. From bone they fashioned *drills*, *polishers*, *needles* and *daggers*.

Reindeer horn was not used only for the manufacture of ordinary implements; large pieces

of it have been found pierced with one or more round holes and ornamented with engravings or raised carvings. Lartet takes these for staffs of authority (bâtons de commandement) : others consider that they were used in harnessing the reindeer, which must have been domesticated if we accept this hypothesis. Perforated phalanges of the reindeer go by the name of "*hunting whistles*" ; notched bone plates pass for *tokens* or *records of the chase.* (marques de chasse).

The men of this period were artists. They represented by means of engravings and carvings a number of the animals which lived near them, and so faithful were these outlines that it is often possible to identify the species. They also executed some small human figures, which are as a rule remarkable for the excessive development of the posterior parts. But these little figures are far from being as perfect as the reindeer and other animals, which the artist preferred to take as models.

In those districts where the reinder was scarce, as near the Baoussé-Roussé, the men of this period were deprived of a great resource. Hence they were obliged to supplement the antlers to some extent with stone for the manufacture of *lance* or *arrow-heads.* Thus we find a flint *lance-head,* resembling that of the Moustier type, but worked on the sides and at its point with wonderful care.

V. — Quaternary Man and his Mode of Life.

Although we are certain of man's existence at the dawn of the Quaternary Epoch, we know little as yet of the conditions under which he lived. But we do know that the temperature was mild, for the *Elephas antiquus*, the *Rhinoceros Merckii*, the hippopotamus, etc, which have left their bones in the gravel beds of Chelles, were adapted to a warm climate.

It follows that these primitive men were able to live in the open air or under rough shelters. Feeling no need of clothing, they wandered about on plain and plateau, and followed the water-courses ; it is in these last that the greatest number of implements of this period have been found. Being obliged in self-defence to kill the fierce animals that surrounded him, man would naturally use their flesh for food ; in any case game was not scarce either on the plains or in the rivers. Armed as he then was man can have had no difficulty in providing for his wants.

During the Moustier period the climate had become considerably cooler. The sub-tropical mammals had disappeared ; and though we find, side by side with the cave bear, a rhinoceros (the tichorhine) and an elephant (the mammoth), these were covered with a thick woolly coat which enabled them to resist the cold. Man was obliged to seek shelter. Caves

on the banks of rivers hitherto flooded were exposed as the waters fell, and in these the *troglodyte* took up his abode. He was obliged to clothe himself and he turned into garments the skins of the animals which he had slain. He prepared the hides with *scrapers* and pierced holes in them with *awls*, fastening them together with thongs. He continued to hunt, but the worn condition of his incisors shows that he included in his diet wild plants and roots.

We know the characteristics of the race which then inhabited these lands. Small in stature, with low skull, receding forehead and enormously thick superciliary ridges surmounting great round eyes, these men were prognathous and had receding chins. Judging from the shape of the thigh-bone and tibia, they must have walked with their legs slightly bent. This race, which is now well known, is called *Neanderthal* or *Spy* from the names of the localities where the most interesting remains were found.

At the time when I wrote the first edition of this work, anthropologists supposed that the fine race of the Cro-Magnon or Laugerie type had followed directly on the Neanderthal men. Great differences existed betwen the two, the later being so much more highly developed that it seemed difficult to derive it from the

earlier. No link was then known between the man of Neanderthal and the Cro-Magnon type. But since that date a discovery of the utmost importance from the standpoint of evolution has been made at the Baoussé-Roussé. In the course of the excavations carried out by the Prince of Monaco in the Children's Cave, le Chanoine de Villeneuve found two skeletons presenting strongly marked negroid characteristics. These had certain points of resemblance with the race of Neanderthal, certain others with that of Cro-Magnon. In a recent essay (1) I have given a detailed description of this new type or race, and have proposed for it the name of *Grimaldi* which has been adopted by specialists.

As I shall have occasion to mention this race again and to give certain details about it at the end of this little work, I need not now enumerate its characteristics. For the same reason I will not now enlarge upon the numerous representatives of the Cro-Magnon race which have been met with in the caves of the Baoussé-Roussé.

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(1) Dr R. VERNEAU, *Les Grottes de Grimaldi (Baoussé-Roussé). Anthropologie* In-4 de 212 p. avec 45 fig. et 11 planches en héliogravure, Monaco, 1906. - Cf. aussi : *Les fouilles du Prince de Monaco aux Baoussé-Roussé. Un nouveau type humain* (L'Anthropologie. T. XIII), et ALBERT GAUDRY, *Contributions à l'Histoire des Hommes Fossiles* (Ibid., T. XIV, 1903).

During the time when the Negroids and the Cro-Magnons lived the climate was still cold, and Primitive Man was constrained to seek the shelter of caves. He continued to clothe himself in the skins of animals which he stitched together with bone needles such as those noticed above. Being better armed than their predecessors, these men must have found it easy to procure food ; especially as the wild animals, such as the reindeer, horse etc, on whose flesh they lived, abounded at this time, forming large herds.

Thus the Cro-Magnon men, and perhaps also those of the Grimaldi type, had leisure to develope their artistic instincts. It was they who executed those remarkable tracings and carvings which I have described. They also delighted in adorning their persons ; and there was a brisk bartering of ornamental shells between tribe and tribe. These people must have lived under some social system. Possibly they possessed religious beliefs, for certain hanging ornaments have been regarded as amulets or charms. In any case it is certain that they bestowed care upon the bodies of the dead, burying them in the caves where they had lived.

VI. — Neolithic Man.

The race of Cro-Magnon outlived the Quaternary Epoch. It survived the transition be-

tween that epoch and the present, a period upon which we are beginning to acquire some information, thanks to the researches of M. Piette. At the commencement of the present epoch these people still dwelt in caves and hunted. But the reindeer had migrated, and they thus lost one of their chief resources. Their handiwork suffered in consequence as they were obliged to substitute stone for the antlers.

Fresh types of implements were invented, notably a kind of hatchet or axe (tranchet) which was not polished at is broader extremity but ended nevertheless in a slanting edge. Experience had taught these men to choose the best stones — those which split the most easily and yielded the largest flakes. They could distinguish good flint from bad, and make implements remarkable for their size. Perhaps in the course of time they even discovered how to polish some of them.

Then invaders came ; some with short broad skulls, others with long narrow elliptical heads. They had arrows with barbed flint heads, knew how to polish their stone implements and made coarse pottery. They had domesticated certain animals and cultivated a few plants. These men buried their dead in large chambers, called *dolmens*, built of huge slabs. They also constructed huts ; and it is possible that a few of their predecessors did so too.

War was waged between this new race and the descendants of Quaternary man. The invaders, by virtue of their superior equipment, obtained the upper hand, and some of the conquered deserted the country and migrated southward. But a good number remained in the home of their ancestors, and when peace was concluded intermarriages took place and the two races were amalgamated. The Cro-Magnons learnt from their conquerors to polish their *axes*, *chisels* and a few other tools, to make pottery, to domesticate animals, to cultivate plants and to construct dolmens. At this time stone implements reached a high state of perfection, and those which were not polished were very carefully worked ; innumerable minute chips were removed, no doubt by pressure, from knives, lance - or arrow-heads, daggers, etc., and thus very regular shapes were obtained. These neolithic implements possess a distinct character of their own, which enables them to be easily distinguished from palaeolithic tools.

These then are the main facts about the Stone Age wich the researches of modern times have brought to light. In this brief sketch I have passed over many questions which are by no means devoid of interest : but I have been obliged to limit myself to generalities lest I should take up too much space. I trust that this introduction, in spite of its omissions,

will enable the reader who has no archaeological knowledge to understand without much trouble the following pages which are devoted to the Barma-Grande.

CHAPTER I.

The Caves of the Baoussé-Roussé.

I. — Situation.

In passing from Mentone along the coast into Italy a great mass of rock will be noticed about 200 yards beyond the frontier. On account of its colour it is called in the Mentone dialect, *Baoussé-Roussé*, that is Red Rocks; (In Italian *Balzi Rossi*). The Corniche road leading to Genoa, passes above this rocky mass, wich now ends abruptly on the side facing the sea, because for many years the stone has been quarried for building material. Today a small plateau about 30 yards wide exists between the foot of the rocks and the sea.

Formerly the configuration of the cliffs was rather different. On the southern side they stretched down almost to the water's edge, being separated from it only by the Roman road, the Via Aureliana, of which traces still remain. Then the slope also was less abrupt.

It is not only to the south that this mass has been cut away: it has been tunnelled from west to east by the railway which runs from Marseilles to Rome and Naples. (Fig. 2).

The Rochers-Rouges contain many large caves, all opening to the south. As far back as

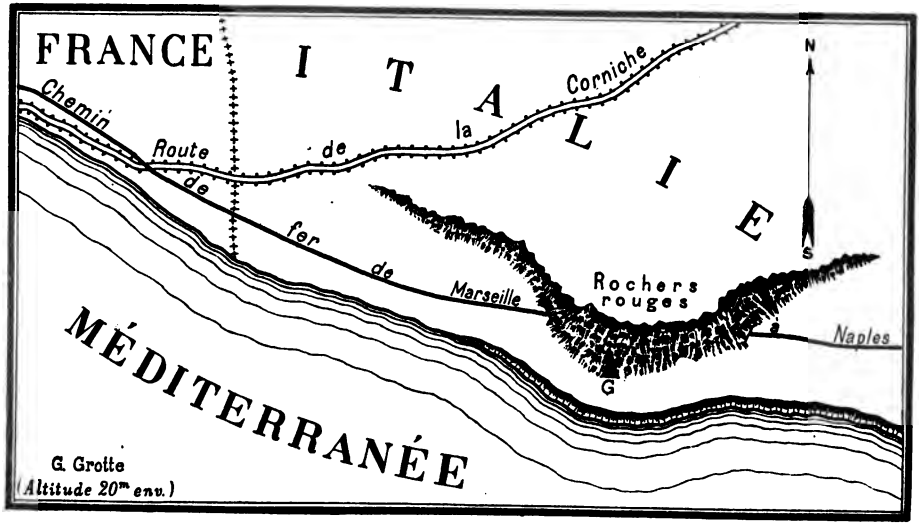

FIG. 2. — The Baoussé-Roussé and the Barma-Grande (G.).

1786 de Saussure had studied their formation. But they were to remain half a century longer before attracting any special attention. It was in 1846 that Florestan I, Prince of Monaco, thought of examining them. A few years later his example was followed by M. Antonio Grand of Lyons, who from 1854 to 1858 made investigations every winter in the caves. Then followed Messrs. Forel (1858), Moggridge (1862 to 1871), Ernest Chantre (1864), Paul Broca (1865) Costa de Beauregard (1868), Em. Rivière (1870 to 1875). It would be ungracious to omit from this list the name of M. L. Julien, and that of M. Bonfils, formerly "Syndic des marins" at Mentone, who during many years turned up the earth of the caves of the Baoussé-Roussé and collected a considerable number of bones and worked implements.

During the years 1882 and 1883 the Hereditary Prince Albert of Monaco undertook excavations in the Barma-Grande which were continued by Professor Orsini in 1883. Since 1892 M. Abbo has carried on investigations almost uninterruptedly in this, the most important of all the caves; and the very numerous objects found there are now arranged, as I have already said, in the Museum Praehistoricum. Finally, during the years 1895 to 1902, Prince Albert I ordered systematic excavations to be carried out under the direction of le Chanoine de Villeneuve in the Children's Cave, the Abri

Lorenzi, the Grotte du Cavillon and the Prince's Cave -- this latter being hitherto quite unexplored — and the results exceeded all expectations. The objects found in these caves may be seen in the Anthropological Museum at Monaco, which was built especially for them. These excavations were so carefully conducted that we are now enabled to solve definitely certain much disputed questions.

The numerous books written about the Mentone Caves have made them famous. They are generally known by this name, though situated, as I have said above, on Italian soil. In 1846 they still belonged to the principality of Monaco; but now they are included in the Kingdom of Italy, being in the "Commune" of Ventimiglia below the Village of Grimaldi.

It is a delightful walk of about forty minutes from Mentone to the Baoussé-Roussé. Or we may take the tram which runs as far as the Promenade Saint-Louis, and from there the caves are only ten minutes distant. Lately they have been made accessible even to carriages, which set down visitors at the "Restaurant des Grottes" established by M. Abbo; while the French and Italian "douaniers" allow traffic to pass freely.

The road skirts the sea and passes by many a lovely garden, charming villa, and palatial hotel.

The whole coast as far as the Rochers-Rou-

ges is sheltered from the north wind by a semicircle of high hills which, at a distance of three miles from the sea shore, rise to 4,000 feet in Mt. Grammondo. It is easy to understand, after visiting this place, why Mentone is so favourite a winter resort and why our prehistoric ancestors chose this privileged coast for their home. The excavations mentioned above have proved that the caves of the Baoussé-Roussé were used as shelters and burial places at a very remote epoch. And it is the principal results of these researches that I wish to explain in this little book.

II. — General View.

There are nine caverns in the Rochers-Rouges. They are hollowed out of a mass of nummulitic limestone, that is to say a compact calcareous rock which was originally formed at the bottom of the sea. This is proved by the presence in it of thousands of small marine shells called *nummulites*. The size of the caves is considerable. The largest, the Barma-Grande (the fifth from the frontier) still measured, in 1892, 53 feet from front to back, and about 13 feet in breadth at the entrance. It narrows to a width of 11 feet near the middle, and at a distance of 12 feet from the end it is only four feet wide. The height of the cave at its entrance

is about 65 feet, and it has not yet been cleared to the actual bottom. Thirty years ago the cave extended further southward and then measured between 90 and 100 feet from back to front : its width at the entrance was then 22 feet. This shortening of the cave is due to the fact already mentioned that the nummulitic limestone, being good building material, was quarried away to the south by the owner and his neighbours.

The entrance of the Barma-Grande is about 65 feet above sea level and faces the shore which is to the south, as do all the other caves in the vicinity.

When the mass of the Rochers-Rouges emerged from the Mediterranean the caves were quite empty. But little by little they became partially filled with fragments of rock which had detached themselves from the top or the sides. Various substances found their way into the cave, either by cracks in the rocks, or by the entrance. Ashes and charcoal, from fires lighted by the people who took refuge there, gradually accumulated, together with bones of animals most of which must have been killed by man and brought there to serve as food. Thus the Barma-Grande, which was originally over 65 feet high was gradually filled up to within about 30 feet of its roof. This deposit therefore is more than 30 feet deep. Centuries must have elapsed for the formation of so thick a layer. But at the present time a great deal of

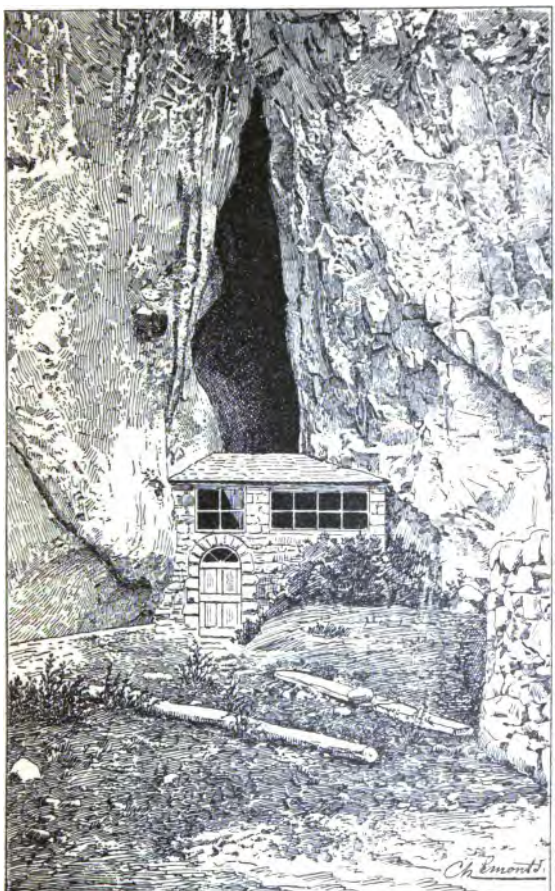

FIG. 3. — The entrance of the Barma-Grande in 1899.

this deposit has disappeared, the owner of the cave having removed the fertile earth in order to make a garden near the entrance. It was when digging out this detritus that the interesting discoveries were made which I am about to describe. The level to which the earth formerly reached can still be clearly seen. In 1884, when M. Julien and Bonfils of Mentone began their excavations, they were careful to drive nails into the rock to mark the original height of the deposit. Moreover the walls of the cave are of a lighter colour where they were covered by the mould,and the upper portion, having acquired a dark grey tint from exposure to the air, contrasts with this.

As regards their age, it is obvious that the oldest layers are those deposited at the bottom of the cave, and the most recent those which are on the surface. But it is important to ascertain whether the soil has been disturbed, for in that case objects from the lower levels might have been brought to the top, whereas other specimens which lay originally near the surface might have fallen to a lower level. It must be admitted with regard to the Baoussé-Roussé caves that this point was not always considered ; in fact the excavators paid no attention to this question until a year or two ago.

The first investigators gathered together carefully all the remains of animals and of hu-

man handiwork they came across; but they did not think of making notes of the level at which each object was embedded. Fortunately most of them dug only in the upper layers.

M. Rivière seems at first sight to have acted otherwise, for he says that he examined the earth in the fourth cave in the order of the successive deposits "digging it out little by little and in layers ten inches thick from the entrance to the further end of the cave" (1). But he constantly omits to inform us at what depth each object was found. Doubtless this seemed to him a matter of little importance, for he had early come to the conclusion that the whole deposit had been formed during the Quaternary Epoch. "The Mentone caves, he says, — those in any case which we have explored — belong from the surface of the soil to the bottom to one and the same geological epoch, namely the Quaternary" (2). Many times he reverts to this, and it did not occur to him to establish any subdivisions. As in his opinion all belonged to one period, the question of the different levels had not the same importance which archaeologists as well as geologists and palaeontologists attach to it.

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(1) É RIVIÈRE, *De l'antiquité de l'homme dans les Alpes-Maritimes*. Paris 1887, p. 129.

(2) É. RIVIÈRE, *Op. cit.*, p, 199.

Nevertheless pottery and polished axes were mentioned as having been found in the caves of the Rochers-Rouges, and it was impossible to refer these objects to the Quaternary Epoch. M. Rivière exerted himself therefore to prove that these discoveries were doubtful and that certain specimens had been brought in from elsewhere. But he himself found a polished axe broken at both ends. "I found it (he writes) on the surface of the ground, among a few stones heaped up in one corner of the third cave where the Italian 'douaniers' often sheltered while watching for smugglers : for when I first began my excavations smuggling was still freely carried on. And many a time one or other of our caves served these smugglers as places of refuge at night, while their cracks and crevices were used as hiding places for goods which were to be secretly conveyed across the frontier. Under these circumstances it is impossible for me to determine the true place of origin of this axe". (1)

It is probable that neither the 'douaniers nor the smugglers brought this axe here, but that it lay originally near the surface of the cave-earth. In any case the probability of the existence of a thick layer which began to be deposited at the beginning of the Quaternary Epoch, and increased till the end of that epoch,

(1) É. RIVIERE, *Op. cit.*, p. 300.

should have induced him to proceed carefully and methodically.

At the outset the excavations were carried on in the Barma-Grande with the same want of system as elsewhere : for when M. Abbo began to empty the cave he had no thought of scientific investigation. The surface layers were mixed in his garden with earth from different levels of the deposit which had been removed from the front. Fortunately the discovery of human skeletons modified in some degree his method of procedure. The wholesale clearance was temporarily checked. Thus I was enabled to make some accurate observations in the lower layers, and even now the cave is far from empty. These observations coincide in a very satisfactory way with those made by le Chanoine de Villeneuve in the neighbouring caves, the layers of which agree closely with the stratified deposits of the Barma-Grande.

M. de Villeneuve carried out his excavations with minute care. Layer by layer and hearth by hearth he made notes of everything that he met with in the whole depth of the cave-earth and by this means was able to establish numerous subdivisions. I shall not have space in this small book to describe all these subdivisions, so I will merely refer those who may desire more detail, to the work published by M.

L. de Villeneuve (1) and that of Professor Marcellin Boule (2). But I will condense into a few lines the information gathered from the study of these two caves which have been systematically excavated from top to bottom.

« The deposits in the Prince's cave », says M. Boule, « differ sufficiently in character to be divided into two groups separated by large blocks which have fallen down ». Below were found remains of sub-tropical animals such as *Elephas antiquus*, *Rhinoceros Merckii*, and the hippopotamus. Higher up the hippopotamus no longer occurs and the chamois appears. At a still higher level the fauna peculiar to a hot climate is completely absent, but numerous remains of cave-dwelling carnivora are found, and soon the reindeer is met with in the deposits.

In a word, the animal remains dug out of the Prince's Cave prove that the cave-earth was deposited during the Quaternary Epoch. The lowest strata correspond to the Early Quaternary, the intermediate ones to the Middle Quaternary, and the uppermost layers to the Recent Quaternary.

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(1) Chanoine L. de VILLENEUVE, *Les Grottes de Grimaldi (Baoussé-Roussé). Historique et Description.* In 4· de 70 p. Monaco, 1906.

(2) MARCELLIN BOULE, *Les Grottes de Grimaldi (Baoussé-Roussé). Géologie et Paléontologie,* In 4 de 156 p., avec 18 fig. et 13 planches, Monaco, 1906.

The deposits of the Children's Cave would seem on the whole to be of a slightly later date than those of the Prince's Cave. Nevertheless the lowest layers also contained remains of *Rhinoceros Merckii*. But instead of being associated with those of *Elephas antiquus* and the hippopotamus, they were found side by side with bones of the large cave-bear (*Ursus arctos*). Hence we may infer that these layers were formed during the period of transition between the Early and Middle Quaternary. Stone implements found at this level prove that man resorted to the Caves of the Baoussé-Roussé at this period.

Immediately above begin the Middle Quaternary layers. These are characterised by a large ox, the cave-bear (*Ursus spelaeus*), the cave-hyena (*Hyæna spelæa*), and a very large beaver, also by the absence of the rhinoceros. Added to these we soon find the elk (*Cervus alces*), the panther (*Felis pardus*), and the marmot (*Arctomys marmotta*). In the lower layers of the Middle Quaternary, two human skeletons were found of a markedly negroid type, and at a higher level one showing the Cro-Magnon characteristics.

The Recent Quaternary deposits in the Children's cave consisted of deep layers containing remains of reindeer (*Cervus tarandus*) and numerous stone implements.

Finally, in some soil belonging to the upper

layers which was left adhering to the western wall of the cave to mark the level of the deposit, M. de Villeneuve found one more skeleton. This was on a hearth, and near it lay the remains of wild boars, wild goat, and red deer. Above this skeleton he met with the same species, and also the bones of a horse. But as all these animals have also been found in the deposits ascribed to the Recent Quaternary, and exist at the present day, it is very difficult to assign an exact date to the layers in which the bones were discovered : they may be quaternary or may equally well have been deposited during the Present Epoch.

However that may be, the observations that were made in the Prince's cave with a care that is beyond criticism, will prove to be of undoubted value to us in determining the date of the deposits in the Barma-Grande.

III. — The Barma-Grande.

The information given above about the general aspect of this cave need not now be repeated. I have mentioned that it was not completely excavated, since M. Abbo has not yet reached the rocky floor. A considerable depth of soil still remains to be dug out ; but an examination of the lower layers proves them to be similar to the deposits of the neighbouring caves. It is possible now to distinguish clear-

ly layers belonging to different periods. And, though we may not be able to trace their sequence with as much detail as did M. de Villeneuve in the Prince's and Children's Caves, we may nevertheless say a few words about the layers. I shall begin with the most ancient, that is to say with the lowest stratum, and describe them in ascending order.

A. — Early Quaternary Layer

While digging in the lower layers of the Barma-Grande, M. Joseph Abbo met with abundant animal remains which have not yet all been identified. I will mention only rhinoceros and elephant. Of this last pachyderm he found a few teeth, several odd bones, and an iliac bone to which the upper part of the femur was still attached. This fact proves that the soil at this level was quite undisturbed, and enables us to assert that the layer in question was formed while elephants belonging to the species found in the Baoussé-Roussé still existed in the South of France.

The rhinoceros is represented in these quaternary deposits by two species ; *Rhinoceros Merckii* which lived during the period when the Early Quaternary strata were being deposited and while the climate was still warm ; and the woolly rhinoceros (*R. tichorinus*), a

mammal belonging to the Middle Quaternary. The bones unearthed by M. Abbo belong to the first-mentioned species. Their presence in the Barma-Grande would lead us to believe that the earliest deposits date from the lower pleistocene (1), if indeed this species had not an even wider range in time. But whatever doubts we may have, disappear when we examine the remains of the elephant.

FIG. 4. — Molar of *Elephas Antiquus*.

Many fossilized elephants have been found in Europe. Three of these, the *Mastodon*, the *Dinotherium* and *Elephas meridionalis* lived during the Tertiary Epoch. *Elephas antiquus* is characteristic of the Early Quaternary, whereas the Mammoth (*E. primigenius*) existed in the Middle Quaternary, together with animals adapted to a cold climate. It is a little surpris-

(1) Dr. Verneau, *explains his use of this term in Chapter V.* (Translators' Note.)

ing at first to find that a rhinoceros and an elephant lived in Western Europe at a period when the glaciers had reached their maximum; but both these animals were provided with a thick woolly coat which enabled them to resist a very low temperature. The Mammoth was remarkable for its large recurved tusks. The fur has naturally disappeared from all specimens except those discovered in Siberia, where the last representatives of this species have been preserved in the ice as though in a refrigerating apparatus. One might imagine that if the tusks also are not to be found it would be difficult to identify the animal; but this is not the case, for besides certain peculiarities in the skeleton, the molars are characteristic enough to permit of our determining with certainty the species to which they belonged. The most ancient Mastodon had molars with transvers ridges of tubercles isolated from one another. In a more recent species these tubercles are joined so as to form ridges separated by deep furrows. Later on the ridges become more numerous, and the furrows are less deep and partly filled up with cementum. Finally the furrows are completely filled up; but the laminae covered with enamel which divide the molar vertically vary in number and position according to the species.

Now, the molar found by M. Abbo in the lower layers of the Barma-Grande is undoubt-

use to us as regards the fauna. In the museum of Mentone there are a few bones of mammals collected long ago by these gentlemen, and these have been identified as belonging to the following species :

1. Horse (*Equus caballus*).
2. Red deer (*Cervus elaphus*).
3. Roebuck (*Cervus capreolus*),
4. Urus or wild bull (*Bos primigenius*).
5. Goat (*Capra primigenia*).

But as we possess no information whatever as to the levels at which these bones were collected, we can draw no conclusions from them.

M. Rivière should have furnished us with accurate details if he conducted his excavations with the great care of which he speaks. But on the contrary we find in his book only vague information. Writing about the animals of the fifth cave or Barma-Grande (la Grande Grotte) he expresses himself in the following words : « As regards the fauna, we found in this cave nearly the same animals as in the first four caves, excepting that bones of batrachians were more numerous. Moreover, bones, teeth of every description, both whole and broken, are so abundant that at a certain depth below the first level the earth is almost entirely composed of them.» (1) He draws particular attention to the abundance of the com-

(1) Ém. RIVIÈRE. *Op. cit.* p. 181

mon boar wich he calls *Sus scrofa fossilis*, and of another pig said to be *Sus Polucci*. He also notes, near the bottom of the cave, an accumulation of the antlers of Cervidae, lying « on hearths situated at a depth of five feet and lower ». The words " five feet and lower " are not accurate enough to draw any conclusion from, as the Quaternary stratum might end at a lower level.

As regards bone implements, M. Rivière does not give us any more precise information. Though rare in the upper layers «they were more numerous (he tells us) after a *certain* depth». (1) He mentions the bone of a bear cut into the shape of a drill, and the rib of an ox which had been used to make a polisher, besides numerous objects of stag's horn or bone. When speaking of the ox's rib, he remarks that it is of a mahogany colour like many other articles and especially some of the rhinoceros' teeth. He must therefore have found rhinoceros' teeth. Considering the relatively small depth to which he dug, it is extremely probable that the rhinoceros in question was not *Merkii* but *tichorinus*, a much more recent animal than his relative.

This question was by no means solved when M. Abbo made his first discoveries. His interest being roused by the presence of human

(1) Ém. RIVIÈRE. *Ibid.*, p. 187

remains in the layer now under discussion, he collected everything that he met with at the same level. I had proved that the skeletons were those of bodies buried in a trench whose depth it was impossible to ascertain, and it was highly probable that they were not contemporary with the cave-earth in which this trench had been dug. Not possessing, at that time, the valuable evidence which the Prince of Monaco's excavations have afforded us on the age of similar interments in the Children's Cave, we might well be in doubt, more especially as M. Rivière's observations were so inaccurate as to lead some authorities to uphold him in regarding the skeletons as Quaternary and others to maintain that they were not more ancient than Neolithic times.

In order to determine approximately the period to which these human remains belonged, I advised M. Abbo, who had consented to entrust me with several boxes of animals' bones, to send me those specimens only that had been found in close proximity to the skeletons. Professor Henri Filhol, and M. Marcellin Boule, now Professor of Palaeontology at the Museum of Paris, were good enough to examine these. The recognised competence of these two scientists leaves no question as to the accuracy of their identification. This is the list of mammals which they named :

1. The fox (*Canis Vulpes*),

2. The horse (*Equus caballus*).
3. The wild boar (*Sus scrofa*).
4. The ox (*Bison europeaeus*).
5. The red deer (*Cervus elaphus*).
6. The roebuck (*Cervus capreolus*).
7. The ibex (*Capra ibex*).
8. A ruminant belonging either to the genus *Ovis* (sheep) or to *Capra* (goat) represented only by pieces of the jaw-bone containing first teeth.

The remains of the deer are by far the most abundant, and belong to two groups, some are identical with our present deer, while others are larger, approaching in this particular the Canadian stag or wapiti (*Cervus Canadensis*).

In this list there is not a single mammal truly characteristic of the Quaternary Epoch. The horse, the wild boar, the ox and red deer, the roebuck and the wild goat have since been met with in all the deposits of the Prince's Cave and the Children's Cave — in the upper layers as well as in those containing the remains of *Rhinoceros Merckii*, *Elephas antiquus* and the hippopotamus — and they still exist at the present day. Only the larger deer differed in its size from the European deer of today. We require other data therefore to solve our problem.

In March 1899, when I visited the Baoussé-Roussé with my friend M. Boule, my learned

colleague's attention was attracted by a piece of the lower jaw-bone of an animal. This was found in the layer of which we are now attempting to determine the age, and he identified it at once as the remains of a reindeer. Although certain of the fact, M. Boule asked that the specimen should be lent to him so that he might show it to Professor Gaudry. The question was really a very important one, as I shall show directly. The jaw-bone was that of

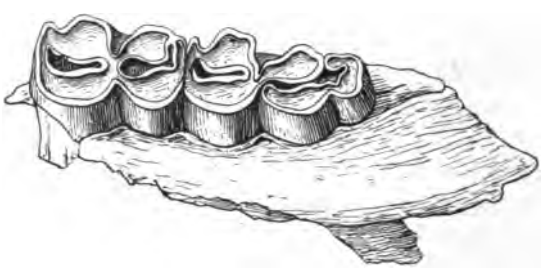


FIG. 5. — Fragment of the lower jaw-bone of a reindeer.

an old reindeer, and the two molars still left in it are much worn, (fig. 5), so that the internal and external layers of enamel which touch one another, and which are quite differently arranged to those in the red deer, could be clearly seen. Thus it is undeniable that the layer now under consideration was formed

while the reindeer (*Cervus tarandus*) still lived in the South of France.

M. Boule's discovery is of great interest, for the reindeer was known to have extended as far south as the Pyrenees, but it was thought not to have reached the Mediterranean slopes of the Alps. On this point M. Rivière wrote: «The reindeer does not exist in the caves of the Baoussé-Roussé; we have never found the least trace of it there. It seems also to be wanting in all the other Italian caves. This absence of the reindeer cannot be accounted for by the period during which our cave men lived, for not a single bone of this animal has been found in the Grimaldi Cave, the fauna of which is certainly much older than that of the Baoussé-Roussé. The absence of the reindeer must therefore be explained by climatic conditions, in spite of the presence in these caves of remains of *Rhinoceros tichorhinus* and of *Gulo spelaeus*. At any rate it seems pretty sure that the reindeer did not descend to the southern slopes of the Alps.» (1).

That which appeared so certain to M. Rivière is now no longer so: the reindeer most assuredly lived on the Mediterranean slopes of the Alps. It is not only in the Barma-Grande that remains of these animals have been met with, for le Chanoine de Villeneuve has found them

(1) Em. RIVIÈRE, Op., cit., p. 265, 266.

in the Prince's Cave and in the Children's Cave. The steepness of the mountains in the vicinity of the Baoussé-Roussé might lead us to suppose that this district was not suited to the reindeer, although in the north of Europe this animal in its wild state is known to retire to the heights during the hot season. But the configuration of the Mediterranean coast was different in the Quaternary Epoch from what it is today. Soundings, carried out by the Prince of Monaco, prove that a plateau exists at no great depth below the sea. In this plateau there are depressions continuing the ravines of the coast: these are doubtless the beds of the ancient rivers which carried the waters from the mountains down to the sea. These depressions could not have been formed unless this plateau had at some period been raised above sea level. It is here, no doubt, that the great herbivorous animals of Pleistocene times found their food, and that the reindeer grazed.

I must not omit to mention among the animal remains found in the reindeer layers, the tooth of a feline, probably of *Felis spelaea*. In the neighbouring caverns the cave-lion has been met with side by side with the reindeer (*Cervus tarandus*). But the bones collected by M. Abbo are by no means all named yet, and we may expect that the remains of other mammals of the upper and middle Pleistocene will be found among them.

Hearths.— The layer deposited in the Barma Grande during the reindeer age not only yielded the remains of numerous animals which were used as food by man, but it contained many other signs of human habitation. Here and there we meet with *hearths* where the dwellers in this cave lighted their fires. These hearths consist of ashes, charcoal, and occasionally of calcined bones; sometimes also they contain stone implements which had no doubt dropped there by accident. When these hearths are intact we may conclude that the earth has not been disturbed round them since the time when man first lighted his fires there. Now this is what we notice in several places throughout the reindeer layer.

Of the hearths, traces of which were still clearly visible in March 1899, I will mention two. One was just under the first skeletons discovered by M. Abbo; the other was two feet below the fourth skeleton found by him.

Human Handiwork. — The human beings who had established their dwelling place in the Barma-Grande at the period when the reindeer still existed in this district, left in the cave-earth numerous remains of their handiwork, such as weapons and tools made of stone, bone implements, and a few ornaments. These relics of the workmanship of the ancient troglodytes of the Baoussé-Roussé are of such interest as to deserve a chapter to themselves.

Human Remains. — Finally the reindeer layer contained human skeletons. These have given rise to so many discussions that I shall have to deal with the subject at considerable length. I will confine myself now to mentioning the existence of human bones in the layer which lies immediately above that of the elephant.

C. — Upper Layers.

I am unable to say much about these layers for the reasons already given : they have not been studied from a stratigraphical point of view. All that I could say about them would be but more or less plausible hypothesis. It is very probable that the Caves of the Baoussé-Roussé continued to be used as shelters by man after the end of the Quaternary Epoch ; but I have not been able to verify this in the Barma-Grande as the upper layers had been completely removed before my first visit in 1892. Nevertheless certain facts published by different authors lead me to believe in the existence of a neolithic layer in the caves of the Rochers-Rouges. The following are the facts to which I allude. Many explorers who dug no further than the surface deposits found the bones of still existing animals only. M. F. Forel, the learned Swiss archæologist, was much struck by the absence of quaternary species in

the layers which he examined, and he endeavoured to explain the phenomenon thus : « It may have been that the Mentone caves were too light to be used as refuges by animals seeking darkness, and that they may have found in the neighbourhood dens better suited to their habits. It is also possible that traces of the animals which preceded man's occupation of these caves had been removed or were buried in the cave-earth at a depth to which our excavations did not reach » (1).

M. Ernest Chantre who examined the fourth cave in 1865 to a depth of three feet, also met with remains of existing animals only, viz : the wolf, fox, horse, wild boar, goat, deer and rabbit. He mentions the roebuck as doubtful, and is not certain that the bone of some bovine animal which he dug up is that of the urus (*Bos primigenius*).

But I attach most importance to the opinion of M. Rivière, though this may surprise the reader after what I have said above. This author, while declaring that the deposit in the Mentone caves « belongs, from the surface of the soil to the bottom, to one and the same geological epoch, namely the Quaternary,» is obliged to admit that the upper layers contain no traces of ancient animals. « It is, (he says)

(1). F. FOREL. «Notice sur les instruments en silex et les ossements trouvés en 1858 dans les Grottes de Menton » Menton 1860

only at a lower level than that to which our predecessors in the study of the Baoussé-Roussé dug that we have found, though in small quantities, the remains of those large Quaternary animals which are now completely extinct».(1) Then why deny the existence of a recent layer, a neolithic stratum? Is this warranted by the traces of human handiwork? I think not.

The excavators of these caves have noticed that, in the upper layers, the flint implements are chipped with great dexterity. M. Costa de Beauregard, after having removed the soil of the fourth cave to a depth of five feet, found numerous flints small but finely worked. (2) M. Issel, who has described the objects collected by Doctor Pérès and M. Ph. Gény in the course of their excavations in the Mentone caves, enumerates five polished hatchets, two whet stones, a sling stone, and several articles in baked earth; also a «spindle-whorl similar to those of the Swiss lake dwellings»; a flat disc, not perforated, two weaver's weights and several discs « roughly shaped and pierced with a hole in the middle, which were apparantly weights for nets » (sink-stones). (3) I

(1) Em. RIVIÈRE, Op. cit., p. 88.

(2) COSTA de BEAUREGARD. Les grottes Saint-Louis, près Menton (Alpes-Maritimes).

(3) Arthur ISSEL. Résumé des recherches concernant l'ancienneté de l'homme en Ligurie. (Compte rendu du Congrès international d'Anthropologie et d'Archéologie préhistoriques. Paris 1867).

know very well, from statements made by M. Gény to M. Rivière, that three of the hatchets of which M. Issel speaks came from the Nice Château ; but he does not say that he found the two others with the baked earth pottery in this place, he merely remarks that the specimens of baked earth pottery were not found in *his presence*.

Finallly M. Rivière himself found neolithic implements. I will not refer to the polished hatchet which he discovered in the third cave and which I have spoken of above. I will mention only the tool of "close grained grit-stone the larger end of which is round and much worn by rubbing" (drawn on plate IV, fig, 31) also a fragment of "a flat disc made of jet and pierced in the centre", (shown on plate IX fig. 17.) I may add that a considerable number of the specimens represented in his album are such as we meet with both in neolithic and in quaternary deposits and that the "chalcedony chisel, sharpened at its wider end with the opposite extremity forming the head" (plate VI, fig. 18) is none other than the celt which is considered by many archæologists as characteristic of the beginning of the neolithic age.

From all this we may very fairly conclude that a layer at least five feet deep was deposited above the reindeer stratum after the end of the Quaternary Epoch, and that during the formation of this layer man continued to frequent

the caves of the Rochers-Rouges. It would indeed be very extraordinary if the formation of cave-earth ceased at the end of the Quaternary Epoch, and that these caves in so favoured a district, which has never ceased to be inhabited, should be suddenly forsaken. It seems much more reasonable to suppose that if objects typical of the neolithic age were not found in large numbers in the surface layers, it is because these layers, being easily accessible, were rifled before Prince Florestan I or M. Grand had thought of excavating them. Before the existence of prehistoric man was recognised it is hardly likely that people should have paid any attention to chipped stones ; but a polished hatchet or a vase could not pass unnoticed.

Thus common sense and the facts observed point to the conclusion that above the layer of the reindeer age a stratum of some thickness was formed at the beginning of the Present Epoch, and that the excavators did not pay sufficient heed to this deposit. This applies to the Barma-Grande as well as to the other caverns. This cave offered far too convenient and natural a shelter to he entirely neglected by neolithic man. It is even probable that if the excavations had been methodically carried on from the first they would have afforded valuable information concerning the period of transition between the Quaternary Epoch and the

Polished Stone Age. For we know that at Mas d'Azil M. Piette found coloured pebbles in a stratum "intercolated between the last layer of the reindeer age and the first of the neolithic". Recently M. Abbo's son picked up a coloured pebble in the Barma-Grande. Unfortunately it was not *in situ*, but was found at the entrance of the cave among material which had been brought from the interior. It is therefore quite impossible to ascertain at what level it originally lay; but the find in itself is interesting and deserves a passing mention.

CHAPITER II.

The Human Skeletons.

1. — Human Bones discovered in the first Caves.

I have mentioned the presence of human skeletons in the deposit which partially fills the caves of the Rochers-Rouges. M. Abbo discovered five in the Barma-Grande where M. Julien had already found one. Before speaking of these skeletons it may be of interest to recall the discoveries made in the other caves by M. Rivière, and more recently by le Chanoine de Villeneuve.

The first cave, or *Children's Cave*, was so called because it contained the bodies of two children, one of them five or six years old, the other at least four years old. These were unearthed at a depth of nine feet on January 27th 1874. The skeletons of the two children lay side by side on the same hearth, parallel to the longer axis of the cave, with their heads towards the north. Their bones showed no trace of that red colouring which I shall have occasion to mention later on. But a large number of small perforated marine shells of the genus *Nassa* were found near the lowest lumbar vertebrae, the pelvis and the upper part of the thigh.

M. Rivière had not excavated the Children's Cave completely ; he had not even thoroughly examined the upper layers ; for le Chanoine de Villeneuve found in this cave four more human skeletons of particular interest. The first was unearthed on April 10 th 1901 at a depth of six feet only. It was a woman's skeleton which lay on its back with the limbs at full length and the head turned to the left. With this skeleton were found two perforated shells, bones of animals, jaw-bones of wild boar, and several flint flakes, all of which had been placed on the body itself. Close to the skeleton were found an extraordinary number of *Trochus*, but none of these shells were perforated and they had therefore not been used as personal ornaments. They may have been placed beside the departed to serve as food in the other world.

The skeleton of a very tall man was met with at a depth of 23 feet. Like that of the woman it lay on its back with the lower limbs extended and the head turned to the left ; but the forearms were bent back on the upper arm so that the hands were in contact with the jaws. A large stone had been placed over the head, doubtless with the object of projecting it ; but in settling down, this had crushed the cranium. A small slab of gritstone, reddened by peroxide of iron, was laid against the occiput like a nimbus. Lastly, five stones covering

a space of 2 feet 6 inches were set up on edge near the lower extremities of the body; in fact a kind of rudimentary tomb had been constructed. The only ornaments found on this skeleton were a kind of necklet of small perforated shells (*Nassa neritea*), a crown made of the same shells, and pendants consisting of the canine teeth of the deer pierced near the apex of the root and without any ornamentation.

On a hearth 2 feet 3 inches below this skeleton lay two others; one an old woman and the other that of a youth between 15 and 17 years old: their position was most peculiar. The youth lay in a natural attitude on his right side. The left arm was stretched along the thorax, the forearm being directed towards the median axis of the body so that the hand reached beyond, and the finger bones were found on the right side of the upper part of the pelvis. The right arm was extended and passed beneath the other skeleton. The femurs were slightly bent and the legs were brought up under the thighs so that the heels nearly reached the lower part of the pelvis.

The old woman lay face downwards, and completely doubled up. The thighs were so much bent that the knees were on a level with the shoulders. The legs also were drawn up

till the feet touched the pelvis. The forearms were raised so that the hands were on a level with the chin.

The hearth on which these skeletons were found had been hollowed out a little to receive the heads. That of the old woman had been protected by stones, two placed vertically with one laid across them. This cavity had been filled up with peroxide of iron.

The only ornaments found on the youth consisted of four rows of perforated *Nassa* shells on his head. Two bracelets were found on the skeleton of the woman, one above the elbow and the other on the wrist. These were made of two rows of the same shells. Some small pebbles of serpentine were picked up between the heads of the two skeletons, also on the forehead and against the palate of the woman.

The results of the excavations made by the Chanoine de Villeneuve in the Children's Cave are most interesting, for they prove that as far back as the middle of the Quaternary Epoch man not only buried his dead but sought to preserve their remains. These results confirm the observations which I have made in the Barma-Grande since 1892. The late Gabriel de Mortillet was convinced that our Quaternary ancestors abandoned the bodies of their relatives, and he had made use of my statements to demonstrate that the skeletons found

by M. Abbo belonged to a later period than that to which I had ascribed them. His arguments can no longer carry much weight.

Neither the *second* nor the *third cave* contained any human remains.

In the *fourth cave*, or *Grotte du Cavillon*, the skeleton of a full grown man was brought to light on March 26th, 1872. (1) It was lying on its left side parallel to the longer axis of of the cavern, at a depth of 21 feet 10 inches. The head lay towards the north, that is towards the back of the cave, and was raised a little higher than the rest of the body. The left hand posterior portion of the trunk were leaning against large rough stones. About 2-3 inches from the mouth a groove had been dug in the soil 7-5 inches long by 1-5 inches wide and 1-4 inches deep. This groove was filled with oxide of iron : the same substance covered the whole skeleton, imparting to it a deep tinge of red The man had been buried with the ornaments and trappings which he had worn in life. On

(1) This skeleton may be seen in the anthropologieal galleries of the Paris Natural History Museum. The "*Guide de Menton et ses Environs*" (13 th edition, 1899). is mistaken in saying of the Barma-Grande, "It was much less reduced in size in 1869 when M. Riviere found in it the human skeleton which was removed by his care to the Paris Natural History Museum. This skeleton would seem to date from palaeolithic times". (p.50). This passage contains a double error ; firstly the skeleton now in the Paris Museum was found in the fourth, not in the fifth cave ; secondly this discovery took place in 1872, not in 1868.

his head he had a sort of fillet or head-band, in the meshes of which were threaded numerous shells all belonging to the species *Nassa neritea*. Twenty-two perforated canine teeth of the deer were collected near the temples. Across the crown lay a borer made from the radius bone of a deer, and closely applied to the occiput were two flint knives. Lastly, on a line with the left thigh were found forty-one perforated shells of *Nassa neritea*. These doubtless formed a leg ornament like those made of hair or skin and worn by certain chieftains of the oceanic isles.

The *sixth cave*, called "*Baosso da Torre*" or "*Caverna della Chiappa del Ponte*" has yielded two skeletons of adults and one of a child, discovered in 1873. The remains of the first adult lay a depth of 12 and a half feet; the second at 13 feet; and those of the child at a level intermediate between these two. The bones were disposed thus:

The first skeleton met with, that of a man, was lying on its back parallel to the longer axis of the cave, with the head towards the entrance. The skull was placed a little higher than the body; the left knee was raised above the pelvis. According to M. Rivière this skeleton seemed to have been deposited on the ground without any trench to receive it. A fine flint knife lay by the left shoulder. Three perforated marine shells (*Cypraea pyrum* and

Nassa neritea) were picked up below the collar bone. These must have formed part of a necklet. Remains of bracelets (perforated shells and the pierced canine toot of a deer) were collected near the lower end of the humerus and on a level with the right wrist. Lastly, pierced shells, discovered near the condyles of the thigh bones, show that the man must have worn above the knees an ornament resembling that which was on his upper arm. In the earth below the neck and chest M. Gerardin is said to have seen under the miscroscope some hairs from the skin of an animal which may have served as clothing.

The second skeleton of the sixth cave also lay parallel to the longer axis of the cavern, with the head towards the entrance. The bones were, as in the former case, coloured a deep red by peroxide of iron. It was resting on the left side with the head raised 9.5 inches above the level of the feet. The hands were clenched; the extremities of the fingers touching the palm. Numerous perforated shells and pierced canine teeth of the deer, found near the head, the cervical vertebræ, the elbows and the wrist, indicate that the man must have worn a fillet, a necklace and bracelets. There was besides, near the upper end of each thigh bone, a perforated shell (*Cypreae*).

The remains of the youth, about 15 years old, were lying prone, and parallel to the se-

cond skeleton, but with the head towards the back of the cave. The bones were not coloured red, nor were any traces of weapons, ornaments or loincloth found near him.

II. — The Skeletons of the Barma-Grande.

A. — The first discoveries.

M. Rivière, to use his own words, "met with no human bones in the Barma-Grande excepting a fragment of the right side of a lower jaw with two teeth, viz : the second premolar and the first large molar. Those were not in the least worn, and had the tubercles fully projecting : they were therefore those of a young person." (1) M. Rivière gives no information whatever as to the level at which this fragment was found.

In February 1884, M. Louis Julien discovered in the cave a human skeleton, the skull of which is preserved in the Mentone Museum. About the position of this skeleton we have some information which is not devoid of interest. It lay on its back at a depth of 28 feet, along the left wall, and parallel to the longer the cave — that is from north to south. "Three large flint flakes lay one at the top of the head, the other two on the shoulders, like epaul-

(1) É. RIVIERE, *Op. cit.*, p. 195.

ettes" (1). The head was covered with "a thick coating of red ochre", and beside it were found some rough lumps of flint, a few unworked flakes of the same substance, also teeth of the ox, deer and goat. It should be noticed that this skeleton was not accompanied by any small stone implements like those met with at a higher level, but by three large flakes of flint. M. Rivière had already observed something analogous, and the same circumstance recurs in M. Abbo's finds.

M. Abbo came upon another human skeleton on February 7th, 1892. I have explained under what conditions this discovery took place. The earth in the cave was being dug out, not with a view to archaeological research, but simply to be used for agricultural purposes. On Sunday, February 7th, one of owner's sons, who was amusing himself by turning up the soil with a pick, found a human skull. The boy's father, on hearing of it, realised the interest of the find, and had the entrance of the cave boarded up.

I have related in "L'*Anthropologie*" (2) how I came to hear of the discovery. M. Emile Delerot, honorary curator of the Versailles Libra-

(1). Cf. L'Homme, 1884, p. 186 (Lettre de M. Wilson, consul des Etats-Unis à Nice.)

(1) R. VERNEAU, *Nouvelle découverte de cadavres préhistoriques aux Baoussé-Roussé, près de Menton.* (*L'Anthropologie* t. III, 1892. 582-540).

ry, was staying quite close to the Baoussé-Roussé, aud as soon as he heard the news, he hastened to inform M. Alex Bertrand of "l'Institut", who conveyed the information to his colleague M. Hamy. After consulting the Minister of Public Instruction, he requested me to set out at once for the excavations with great interest, and during my stay in the neighbourhood of the Rochers-Rouges he was present daily at the exploration which I was conducting. I mention this with the sole object of showing that my investigations were made in the presence of witnesses who were in a position to verify all my statements.

When I reached Mentone on the 22nd of February, a fortnight had elapsed since the discovery of the first skeleton. A second and a third had been brought to light, but unfortunately more than one inquisitive intruder had entered the cave in spite of the barrier and had trodden on the bones.

The first observations made by M. Abbo were confirmed by M. Delerot ; and I was able to verify them to some extent myself. Above the bodies lay a thin covering of red earth, quite different to the soil which filled the rest of the cave. This red earth, the same which M. Julien had noticed as covering the skull of the skeleton discovered by him in 1804, contains a large quantity of peroxide of iron which has imparted to the bones a strong colouring not-

iceable as soon as the remains where exposed to view.

On my arrival the skeletons. only just uncovered, were still coated with this ferruginous earth, and I was able to prove that a thin layer of it existed below them also. By digging near tbese remains I ascertained that the surrounding soil was quite different. The earth had been broken up in front, but at the back it was still at a higher level than the skeletons. Now, by carefully examining the deposit at this end it was evident that had been cut vertically and in a straight line slighlly exceeding the bodies. A trench, the further side of which was still visible, had been dug in the cave-earth. At the botton had been laid a bed of this ferruginous earth, which had been fetched from some distance.

The bodies had been placed on this layer and covered over with the same red earth. This at once arrested the attention of the excavators. The bottom of the trench was about 26 feet below the original surface of the deposit; for M. Abbo had already removed 20 feet of earth and he had to dig another six feet before reaching the skeletons, These lay therefore at about the same level as the one which M. Julien found in 1884 (28 feet), that is at a much greater depth than all those previously discovered in the other caves by M. Rivière.

The new skeletons lay parallel to one ano-

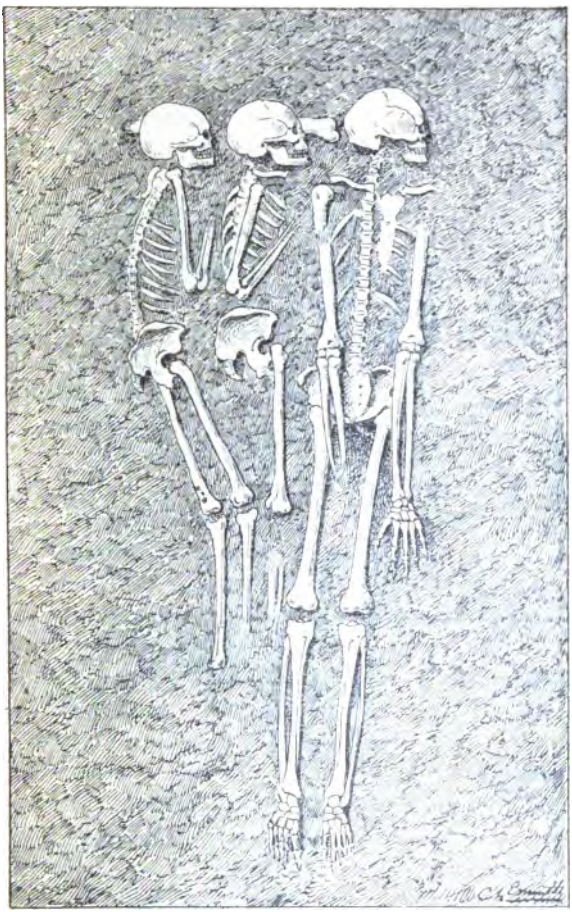


FIG. 6. — Position of the skeletons found in 1892 by M. Abbo.

ther and across the cave, the heads towards the east and all but touching the right wall. The first was scarcely three feet from the present entrance of the Barma-Grande, but as the cavern has been considerably reduced in length by the blasting of the rock, the body must have originally been buried somewhere in the middle.

The three skeletons were not all in the same position (fig. 6) The one nearest to the entrance was that of a man ; it was lying flat on its back, but the upper part was turned so that the skull rested on its left side. The left arm was extended along the side of the body while the right was brought across the thigh.

The middle skeleton was that of a woman, still young, for although the epiphysese of the long bones were consolidated with the diaphyses, and the upper and lower median incisors showed some signs of wear ; the wisdom teeth were still in their sockets. This skeleton was lying entirely on its left side with the legs extended and the forearms flexed so that the hands were on a level with the chin. The skeleton furthest from the entrance cannot be assigned with certainty to either sex. This is on account of its youth ; for judging by the long bones of the limbs, which are not joined to the body, and by the wisdom teeth still completely sunk in their sockets, it is certain that the person was young. We should not be

far wrong in estimating the age as about fifteen years. However, as this individual had

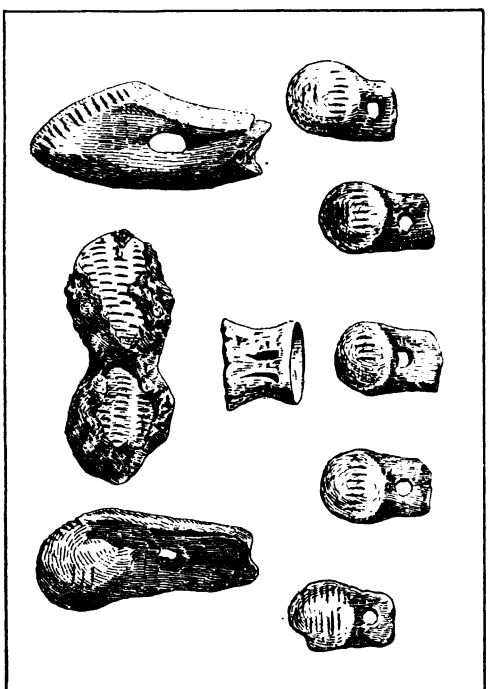


FIG. 7 to 15. - Ornaments from the Barma-Grande.
(Bone pendant ornamented with striæ ; perforated vertebrae of salomon ; form canine teeth of deer perforated and ornamented with striae ; pendant in the of a double olive.

already attained a height of five feet five inches at the age of about fifteen, we may assume that the remains are those of a boy. This skeleton lay like that of the woman, entirely on its left side ; the forearms were also bent so that

the hands reached the chin, and the thighs and legs showed a slight curve.

On the man's head were found canine teeth of deer, perforated and ornamented on the crown with striae (figs. 13 and 15), also vertebrae of fish, and shells with holes drilled in them. These vertebrae are those of a species of fish about the size of a trout; the shells all belong to the species *Nassa neritea*. Round the neck the same skeleton wore a collar made of 14 deer's teeth, a few vertebrae similar to those just mentioned, and some pretty ivory pendants decorated with striae (figs. 7 to 11).

Pendants identical with these were found on the forehead and on a level with the thorax, side by side with fish vertebrae drilled through their axes and larger than found on the head and neck. They are the bones of a kind of salmon (fig. 12). After my departure they discovered, also near the chest, a curious ornament which was thought to have been made from the antler of a stag, but which seems rather to be a piece of carved bone or ivory. (1). It exactly resembles two olives joined end to end (fig. 14). There was no need to perforate this object as it could be suspended by the constriction in the middle. The entire surface of this curious

(1) I wished to make a microscopic section which would have enabled us to ascertain whether it was bone or ivory, but the object is so friable that the small fragment we took crumbled to dust.

pendant is ornamented with small parallel striae. On either side of the left tibia of this

FIGS. 16 to 18 — Large flint Knives.

man lay a large pierced shell of the genus *Cypræa*; both were found below the knee, and

must have been threaded on a string. Finally, just before my arrival, M. Abbo had found, on a level with the left hand, a very fine flint knife worked on one side only. This implement measures 9-2 inches in length and 1-9 inches at its maximum width (fig. 17). The chippings are particularly numerous towards the broader end. In my first memoir on the subject I wrote thus : " The authenticity of this specimen has been contested, or rather it is said that M. Abbo possessed it before the second discovery of human skeletons. This assertion is formally contradicted by him and by those who were present at the finding of the implement. I am furthermore inclined to believe the master quarryman, for this knife is exactly similar to one I myself found *in situ* under the head of the skeleton of the youth, and which I dug out with my own hands after having removed the pieces of the skull. Moreover another blade 10-4 inches long by 2 inches wide (fig. 16) was found in the left hand of the skeleton, that is exactly the position indicated by M. Abbo for the first knife. He could not possibly have forseen that another would be found on a level with the left hand of the woman".

It is M. Rivière who insinuated that the implement in question had been seen by M. Saige, archivist of the Principality of Monaco, in the hands of M. Abbo in 1885 — that is seven years before the discovery of the skel-

eton. I was right in reserving my judgment, for in 1880 le Chanoine de Villeneuve told me that M. Saige had no recollection whatever of having made such a statment, and M. Saige has since given me his assurance to the same effect. We may therefore regard the implement found on a level with the left hand of the man as quite as authentic as the one discovered in my presence.

The skeleton of the woman had its head propped against the femur of an ox, the lower third of which projected beyond the forehad. The ornaments, similar to those of the man, were less numerous. On a level with the skull were collected *Nassa* shells and perforated fish vertebrae, also a bone pendant which was not discovered till later. No collar of deer's teeth was found on the woman, who, however, had on her chest the pendant shaped like a double olive. This ornament is 1-2 inches long with a maximum width of 7 inch. In her left hand she held the large flint knife which I have just mentioned.

The head of the third skeleton lay, as I have already said, on a fine flint knife 6-8 inches in length and 1-9 at its widest (fig. 18). The thickest part of this blade, which projected behind the occiput, is worked with some little care in the shape of a scraper. By removing the pieces of the skull with great care, I was able to note very exactly the arrangement of the ornaments

which had been worn on the head and neck.

FIG. 19. — Fragment collar to young subject.

On the forehead there were, as on the man, several of the pendants represented in fig 8.

The skull was covered with vertebrae of trout and perforated *Nassa* shells. A pretty necklace passed just beneath the right angle of the lower jaw, but beyond that it had slipped and the component parts lay under the left temple. The different pieces of this collar were held in the position they had originally occupied by the earth which had hardened round them. They comprised vertebrae of fish, *Nassa* shells, and the canine teeth of deer, all perforated. The vertebrae were arranged in two parallel lines, and below them a row of *Nassa neritea*. At intervals these three rows were interrupted by a deer's tooth ornamented with striae. Fig. 19 shows with how much symmetry the whole was put together : first a set of four vertebrae, next four more vertebrae, below these again three *Nassa* shells. Then, after the break formed by the deer's tooth, followed a similar arrangement of bones and shells. This necklace must certainly have been very ornamental.

The youth also possessed an ornament in the form of a double olive. It was found after my departure near the left hand. As is shown by fig. 15 it is still partly embedded in a very hard matrix which contains also a certain number of small fish vertebrae.

Several ornaments were collected between the skeletons, and these could not be assigned with certainty to either. Between the man and

the woman two large perforated *Cypraea* shells were picked up; one of them was on a level with the man's right knee. We have just seen that this individual had two of these shells below the left knee ; it is therefore quite possible that the two discovered later belonged to him and matched the others. Near the woman, between her skull and that of the youth, lay a perforated shell (*Purpura* ?), which had probably formed part of the ornaments of the former.

Finally, the mode of these skeletons, discovered by M. Abbo in 1892, entirely resembles those which M. Rivière found in the other caves. The bodies had been embedded in the same ferruginous earth; the flint knives collected near the skeletons were similar ; but those found by M. Abbo were larger than M. Rivière's specimens. The ornaments are nearly identical, although those in the Barma-Grande show finer workmanship. Consequently we may safely assume that, nothwithstanding the difference in level, all these interments belong to the same period. We shall see that there is further evidence in support of this view.

B. — *The Last Discoveries.*

On the 12th of January 1894 M. Abbo, who had begun to clear out the bottom of the large

cave, brought to light another human skeleton. This body lay 21 feet 8 inches behind the first, and five feet four inches above them. Instead of lying across the cave it was extended parallel to the longer axis with the head towards the south, The whole body was turned slightly on its left side (fig. 20), with its left arm close to the ribs and the forearm bent in such a way as to bring the hand up to the chin. The right arm was slightly separated from the thorax, with the forearm and hand placed almost at right angles over the chest. The femora converged slightly near the knees, and the legs were crossed so that the tibia and the shinbone of the right leg lay over the left.

The skeletons discovered in 1892 had been buried in a layer of ferruginous earth, brought from a distance, without any further provision for their preservation. The body which was brought to light two years later was, on the contrary, protected by three large slabs of stone which partially covered it. One of these was placed over the legs, the second was above the thighs and the lower part of the trunk, and third covered the head and chest. The first two rested on the ground, the last, roughly triangular in shape and measuring two feet four inches in one direction and two feet two inches in another, was supported by three other blocks of from 10 to 15 inches in diameter. The slabs and the blocks which supported the stone

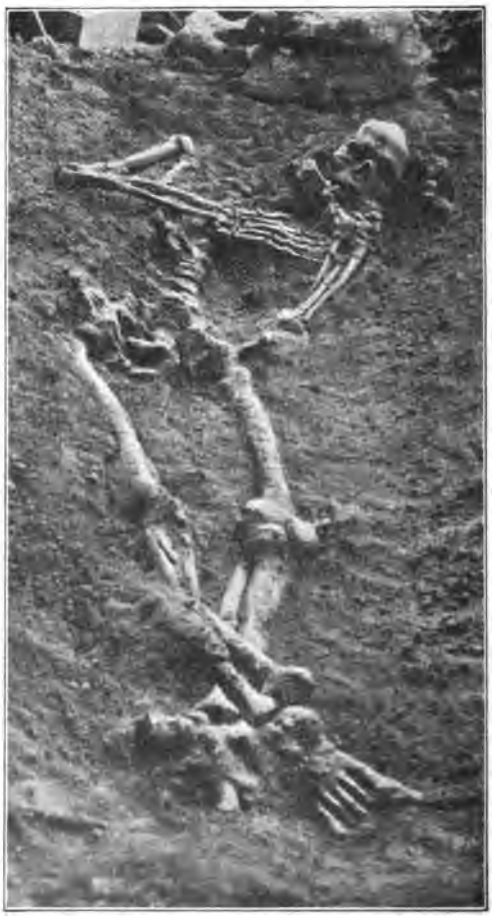


FIG. 20. — Skeleton found Jan. 12 1894 by M. Abbo.

above the head are of limestone, the front slab had a slight coating of stalagmite.

A rough tomb had certainly been constructed over the body. This fact has caused some surprise, and was used as an argument to prove that these men must have belonged to a recent period. But le Chanoine de Villeneuve has found in the Children's Cave remains buried in exactly the same way, and here these rude tombs belonged undoubtedly to the middle Quaternary.

In spite of the existence of this protective covering over the body, the interment seems to be of the same age as the others. It will be shown later that the physical characteristics of the individuals are identical. The details are exactly similar. Thus the man — for it was a male skeleton — wore on his forehead perforated *Nassa* shells, and had to the left of his head two perforated canine teeth of the deer, also three of those little pendants represented by fig. 8, and a shell necklace. Many *Nassa* shells were still adhering to the 6th cervical vertebra at the time of my visit to the Baoussé-Roussé in March 1889, and others were to be seen on a fragment of conglomerate lying near the neck on the left. Lastly near the left hand was found, not a large flint knife, but a fairsized piece of gypsum.

Some time after the discovery of the skeleton in question M. Abbo found a fifth still nearer

to the back of the cave. It was two feet eight inches from the feet of the last and at the same level. This skeleton which was completely charred, was rather incomplete. Nevertheless it was possible to note that the thighs were slightly bent and the legs doubled up, so that the heels touched the haunch. The bones being in their normal position we may conclude that the body had been cremated on the spot. Moreover traces of a large hearth more than two feet deep were found beneath the remains. We shall see that in this case also the cremated body is of the same type as the others. Like them he had his ornaments of *Nassa neritea*, specimens of which were picked up near him by M. Abbo. We may conclude therefore that they are all contemporaneous.

CHAPITER III.

Human Handiwork.

As Man occupied the Baoussé-Roussé caves from the beginning of the Quaternary Epoch to the Neolithic Age, inclusive, it is natural that he should have left in them numerous specimens of his handiwork. But during this long occupation the workmanship of our ancestors improved considerably; their implements were gradually modified, and consequently the tools found near the surface ought not to be identical with those which lie at the bottom of the deposit. For a profitable study of the implements found in the caves it is necessary to classify them according the layers in which they were met with. This is just what those authors who have published works on their excavations have omitted to do. I shall therefore not be able to make much use of their books. Nevertheless I may sometimes glean from them some interesting information.

The investigations of M. Abbo in the Barma-Grande fill up this blank to some extent. It is certain, as I have already said, that the examination of the upper layers has been completely neglected. It is true also that M. Abbo was not qualified to make systematic excavations. Nev-

ertheless, the observations he made, and which I verified to a great extent, are of genuine value. His archaeological knowledge was at that time too limited to admit of his selecting his facts and rejecting those which did not suit him, or of his purposely attributing to one layer objects found at another level. I placed full confidence in his statements when I ascertained that the information which he gave me about his finds coincided perfectly with the results of the investigations carried out by a number of scientific men during the last half century. And there is a fact that further increases my confidence in him. In many instances he has not hesitated to express his doubt as to the exact position of certain finds. Had he not been reliable he would have acted in a different way; for he would have sought, by mentioning some particular level, to increase the value of a specimen which I declared almost devoid of interest unless he could mention the exact spot where he found it.

The reader will forgive this little disgression which I do not deem useless. For efforts have been made to throw discredit on M. Abbo's excavations, and it was as well to show that the accusations which have been made against him cannot be substantiated. I have already dealt with (p. 88) the particular case of flint knife found near the first skeleton, and were I to enter upon a discussion it would be easy

to prove that the other insinuations are equally groundless. I now come to the examination of the finds in each of the layers, beginning with the lowest.

1. — Elephant Layer.

I must first remind the reader that this layer has as yet been explored only to a limited extent. Nevertheless it has already furnished several specimens presenting the appearance of great antiquity, and which, in spite of the imperfect workmanship, afford undisputed evidence that man occupied the Barma-Grande during the epoch in which this stratum was formed.

We are particularly struck, on examining the objects found in this layer, by the abundance of implements made of gritstone, quartzite or silicious limestone. One might almost be tempted to account for the rudeness of the implements by the nature of these stones, which as we know are difficult to work ; but the flint implements do not show any higher finish.

Among the gritstone implements I will mention a *scraper*, 2-8 inches by 1-6 inches, more or less rectangular in outline and rather clumsily chipped on its longest edge. It belongs to a

type which has been frequently met with at Moustier, and even Chelles. A few knives, rarely exceeding 2-8 inches in length, a few "pointes", (*) of the so-called Moustier type, and the *scraper* comprise the gritstone implements which have been found in the ellephant layer.

FIG. 21 — "Pointe" of the Moustier type.

Apart from the plane of percussion ("plan du frappe") and bulb of percussion, which are always clearly defined, these tools show no traces of human workmanship other than a few flakes chipped from the surface opposite the bulb. One "pointe", however, has been

(*) An accomplished archaeologist assures us that "there is no equivalent for the Mousterien "pointe" in English. This word means a "triangular flake worked to a point". We have therefore adopted the French term in our translation in preference to the above periphrasis. Translator's Note.

clumsily worked on this surface ; it measures 2-5 inches in length, 1-3 inches in breadth and 7 inch in thickness. This weapon was too thick to be very effective, and the owner had evidently attempted to thin it down. Several strokes had been given near the plane of percussion ; but the flakes which were detached proving small on account of the bad quality of the stone, the workman had decided to thin down the edges only. These show a few coarse chippings.

The flint implements whtch have been met with up to the present consist entirely of scrapers, knives, and "pointes" (fig. 21) of the same type and showing the same clumsy workmanship as the gritstone tools. Figure 22 represents one of these scrapers. With the exception of the fine knives mentioned above, found near the skeletons in the reindeer layer, this is one of the largest specimens met with, for it is 4-5 inches long, the maximum breadth is 2 inches, and it is an inch thick in some places. This implement has been worked chiefly adapted to the hand, has been left untouched. I have figured in my book *l'Enfance de l'Humanité* a scraper from the gravel pits of Chelles, which closely resembles the one found by M. Abbo in the lowest layer which he explored.

Among the flint implements given me as having been found in the elephant layer, is a small short round-ended scraper of reddish

jasper, which is wrought all round the perimeter with a series of remarkable little chippings

FIG. 22 — Large flint scraper from the elephant layer.

(fig. 23). Its resemblace to certains pecimens of the Madeleine type is so striking, that I am inclined to think that it must have slipped down from a higher level.

My learned friend, M. Emile Carthailhac, who

met with the same coarse workmanship among the stone implements of the Moustier type found in the Prince's Cave, thinks that this coarseness in the workmanship of the tools and weapons is due to the bad quality of the material. "It cannot be denied (he writes) after examining the series of "pointes" and scrapers found in the Prince's Cave, that the artificers

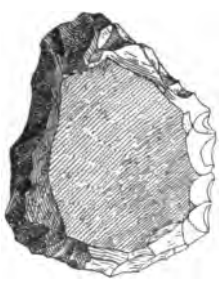


FIG. 23. — Jasper scraper of the Madeleine type.

made the best of such thankless material. As soon as they get hold of a piece of good flint, they produce far better implements, incomparably finer and even elegant. These *pretty "pointes"* are rare, and though unimportant in themselves, they give us a more complete insight into the workmanship of this period.(1) Though there are in the anthropological Mu-

(1). Emile CARTHAILHAC, Le moustérien et le pré-solutréen ou aurignacien des Crottes de Grimaldi (Compte-rendu du XIII[e] Congrès internat. d'Anthropologie et d'Archéologie préhistoriques T. 1. p. 137, Monaco, 1907.

seum at Monaco a few fine specimens which M. Carthailhac attributes to the Moustier period. they are " pointes " which cannot be compared with the scraper mentioned above. It is likely enough that an implement might have slipped from the upper or reindeer layer into the hole made by M. Abbo in digging out the elephant's remains from near the bottom of the cave being thus transformed from the Madeleine to the Moustier period. This is the more probable since the scraper in question is the only specimen of skilful workmanship which has been found this low level.

In short, the bone implements of the elephant layer absolutely resemble those of the so-called Moustier type. This would seem to be the case also in the other caves, judging by certain passages in M. Rivière's book. For this author states that in the Grotte du Cavillon he discovered, at a depth of 34 feet, "the first worked gritstones and limestones of the fourth cave (Cavillon)." These implements resemble in form and dimensions those we found at a depth of 12 feet 6 inches in cave N° 6, (Baousso da Torre) and wich will be discussed presently" (2). He figures one of these specimens ; it is a gritstone "pointe" of the Moustier type, showing ridges of fracture ("arêtes de taille"), but it is not worked along the edges. Thus at the bottom of

(1) Ém. RIVIÈRE. *Op. cit.* p. 175

the Grotte du Cavillon were found implements of very primitive type precisely as in the Barma-Grande, though M. Riviére repeatedly asserts that the workmanship is the same in character from the surface down to the bottom of the caves.

The workmanship of the Moustier type in the *sixth cave* or *Baosso da Torre*, seems to extend to a greater distance from the bottom. M. Rivière writes thus: "Since the discovery of this skeleton, stone weapons and implements have revealed to us a most interesting fact viz: the existence of a type of workmanship totally different from that which we had hitherto found at the Baoussé-Roussé — differing at least in the nature of the materials used by the troglodyte of Mentone, and about which we said only a few word when describing the fourth cave. For at a depth of 12 feet 6 inches, worked gritstones and limestones were met with, at first interspersed with flint implements, but deeper down found by themselves as far as the lowest hearths. The discovery of these gritstone and limestone implements indicates a complete change in the choice of material used by the cave-dwellers for the manufacture of their tools. For the number of flint implements diminishes considerably in this layer; and they disappear completely at a lower level, where they are replaced by implements, weapons, and tools, made of more or

less silicious gritstone, hewn generally with rough strokes and to some extent worked along the edges. These specimens are of much greater bulk than the flint tools. Whereas in the upper layers worked gritstsnes have been but rarely found, and then as quite an exception". (1)

I have not hesitated to quote this passage in its entirety, in spite of its length, for it proves that in the sixth cave, as in the Barma-Grande and the fourth, there existed at the bottom a type of implement very different from that met with in the upper deposits. In the sixth cave the Moustier layer was found at a depth of about 13 feet from the surface. But if we consider that the total depth of the deposit was only 21 feet six inches, we see that the Moustier layer cannot have been more than 8 feet thick. This is much the same as the corresponding layer in M. Abbo's cave.

How is it that M. Rivière did not mention this layer in connection with the other caves? We must first state that the seventh was not explored by him, and that M. le Chanoine de Villeneuve, who has excavated it with the utmost care, found not a single skeleton there; but he collected numerous stone implements in which, as I have just said, M. E. Cartailhad recognises handiwork of the Moustier period.

(1). Em. RIVIÈRE, Op., cit., p. 231.

The eighth cave is really, to use M. Rivière's words, "but of little rock shelter". The ninth, in the words of the same author, "shows no signs of having been the abode of man, and contains no implements in bone or worked flint". Thus there remain but the first, second and third caves, in none of which he mentions the presence of the Moustier layer. But did M. Rivière excavate these caves to the bottom? I will pay no heed whatever to local gossip, but will confine myself simply to the work in which are recorded the investigations of the excavator. In the first cave two skeletons were found at a depth nine feet ; there is no mention of the search having been continued lower down. And now we know very well that they stopped at this level, for this first cavern is the Children's Cave, which the Prince of Monaco has had excavated to the bottom. We will devote a few words to it.

M. le Chanoine de Villeneuve informs us that when he undertook his excavations " the depth of the cave-earth, including the patch of soil left behind as a mark by the former explsrers, was about 31 feet ".. (1). So that M. Rivière, who stopped at a depth of eight and a half feet, had left about 22 feet unexamined. These layers were quite intact, and con-

(1) Chanoine L. de VILLENEUVE, LES Grottes de Grimaldi (Baoussé-Roussé). Historique et description, p. 62. Monaco 1906.

tained a succession of hearths which had not been disturbed. I have already insisted on the importance of the discoveries made in this cave, and will now only recall the fact that below the recent and middle Quaternary strata there existed layers of a very remote epoch in which M. Boule found the remains, not of *Elephas antiquus* or of hippopotamus, but of *Rhinoceros Merckii* associated with bones of the brown bear and the cave bear. Hence we may conclude that these deposits date from a still earlier sub-tropical pleistocene period. But at the front of this cave "the railway cutting has destroyed hearths whose edges were only just traceable, and which were the oldest of all". (1).

In spite of the destruction of these very ancient hearths. M. L. de Villeneuve collected implements of the Moustier period in the layers containing the bones of the *Rhinocéros Merckii*.

The second cave, which we see mentioned as a "pseudo cave", was examined to a depth of nearly seven feet. The layers beneath were searched only "two feet further down"; that is to say the total depth excavated amounted to about nine feet. Finally M. Rivière tells us absolutely nothing about the depth which he reached in the third cave.

Are we not therefore justified in supposing

Em. CARTHAILHAC, Op., p. 139.

that, if in the caves occupied by man the Moustier layer as not always been met with, it is because the excavations were not carried right to the bottom of the deposit, or were not performed with a much care as we could wish? In any case it is certain that in the five caves in which the digging has been carried down to the original floor this Moustier layer has appeared ; and that the greater part of the implements contained in it were made of grit-stone quartzite or silicious limestone.

I have said that among the Moustier implements found in the Barma-Grande there were flint tools. I ought also to mention a large ivory polisher found by M. Abbo outside the cave (reduced to its present dimensions) not far from the remains of *Elephas antiquus*).

II. — Reindeer Layer.

A quantity of worked implements were found in the layers of the Reindeer Age, and as these layers had attained a considerable depth in the Barma-Grande, as well as in the other caves, it is obvious that the implements cannot all be contemporary. But human handiwork preserved the same general character for so long a period, that from a purely archaeological standpoint it is not easy to establish any subdivisions.

Here, however, we must make a slight reservation. It will be remembered that M, Boule working on a palaeontological basis, was able to distinguish clearly three different layers, viz: the early, middle and recent Quaternary. The Moustier handiwork, discussed above, corresponds to the third — and this is the most important in the caves of the Baoussé-Roussé. Some of the implements undoubtebly belong to the middle Quaternary; particularly a bone "pointe" with a split base; similar to those Eduard Lartet found in the cave of Aurignac. Many times since 1861, this type has been met with in layers immediately above those uf the Moustier period. M. Corthailhac regards them as characterising the dawn of the middle Quaternary, an epoch which he names "*aurignacien*. Now "pointes" of this type were discovered by M. Rivière in the Grotte du Cavillon and the Baousso da Torre: M. L. de Villeneuve met with them agsin in the Children's Cave and M. Abbo found some in Barma-Grande. From this it would seem that palaentology and archaeology both agree in distinguishing a layer intermediate betveen the early and recent Quaternary. M. Carthoilhac seems to regard this Aurignac or pre-Solutre type of the implement as persisting throughout the whole period of the cave-earth. But I am inclined to think that if, even at a comparatively high level, we do not meet with the fine

bone implements so common in the Madeleine deposits of the valley of the Vézère, it is impossible to distinguish the mass of the stone implements found in the reindeer layer of the Baoussé-Roussé from those considered by archaeologists as typical of the so-called Madeleine epoch. The short description which follows will, I trust, make this clear.

The objects found in the reindeer layer are sa numerous that I shall not be able to enter into a detailed account of them all. But I will endeavour to give an accurate fdea of the principal types met with in the Barma-Grande.

A. — *Stone Implements.* — These are very plentiful ; nearly all of them are flint of various kinds. Some are yellow and semi opaque, others streaked or veined in different colours. The flint implements from this layer are, on the whole, rather small, a fact already noticed by M. Rivière. If we exclude the very large knives found with the skeletons and already described above, one of the biggest collected by M. Abbo is not more than 1-4 inch long and 1-14 inches wide.

Blades or *knives*, also rough flakes, are found in abundance. Sometimes they have two cutting edges. sometimes only one, in which case the other forms a kind of blunt back. Some of them are astonishingly small, 1-2×-2 inches. The edges show no working, and if in

FIG. 24. — Borer from reindeer layer.

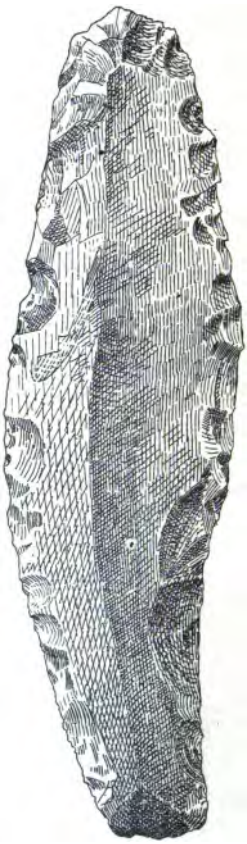


FIG. 25. — Long scraper worked at the edges.

certain cases we notice slight "scaling", to use A. de Quatrefages, appropriate expression, this is due to wear.

Scrapers are nearly as common as knives. They are blades which invariably have a rounded extremity. These scrapers are worked

FIGS. 26 - 27. — Scrapers of the Madeleine type.

sometimes all round, sometimes along the edges and at one end (fig. 25): others again at both end only (figs. 26 to 29). They all belong to the Madeleine type. Whether short or long, careful working will always be found on the convex extremity, and the chips detached are small.

In a few of these scrapers the other end is made into a chisel-like edge by striking off a single flake ; these are the *scraper gravers* ("grattoir-burins"), instruments admirably

adapted for working bone. These gravers are also found without the worked scraper end.

Again we find *borers ;* these are carefully worked at one end so as to obtain a point

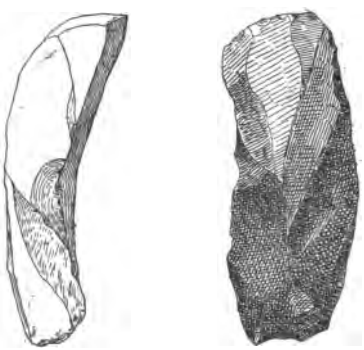


FIG. 28 - 29. — Front and side view of a scraper from the reindeer layer.

FIG. 31. — Engraving scraper (reindeer-layer)

(fig. 24). They may be worked on one, or even both of their edges.

"Pointes" are also extremely common. They are usually worked on both edges and at the

point (fig. 31). They are often very small rarely exceeding 2-4 inches in length.

I have not yet mentioned some very small flints, comparatively long and triangular in section. They have only one cutting edge and the sides which form this edge are smooth and

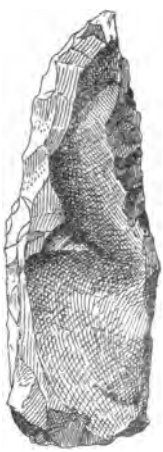


FIG. 32. — Lance-head (pointe) worked at the edges and point : reindeer layer.

without any trace of working. When we find these edges chipped, it has happened in the course of use as is seen in figure 42. This is a case of accidental, not intentional chipping. The third surface, which forms, so to speak the back of the tool, has on the contrary been carefully worked. The point seems to have

been worked with particular care. These *blades with a flat edge* ("lames à tranchant abattu") (figs.32 to 34) as MM. Carthailhac and Boule(1) have named them and which I prefer to call

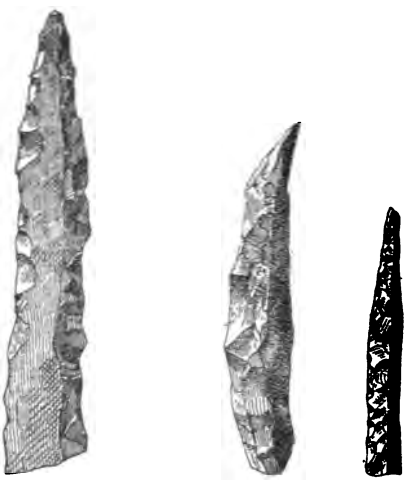


FIG. 32, 33, 34. — Blades with a flattened edge from the reindeer layer.

blades with a flat *back* ("lames a dos rabattu", were probably used for polishing small pieces of bone or shells with the sharp edge, and for polishing small pieces of bone or shells with the sharp edge, and for perforating these with the point. The authors I have just mentioned

(1) Em. CARTHAILHAC et M. BOULE, La grotte de Reilhac. Lyon, 1889, p. 34.

collected a great many of these blades in the cave of Reilhac (Causses du Lot). They found them in a layer which they consider as belonging to the close of the reindeer period, and pratically forming a transition between the Quaternary and the present Epochs.

I cannot conclude this short enumeration of the stone implements of the reindeer period without mentioning a few *scrapers*, rather like those of the lower layer, and a few '*pointes*' showing no chipping, which belong unmistaktably to the Moustier type. The resemble the specimen drawn in figure 21. Are we to consider these as dating from the same period as the implements just described? This might be maintained, for we know that some primitive types persisted, though in small numbers, to comparatively recent times. I have myself collected in dolmens — that is in monuments of the polished stone age — scrapers and "pointes" which archaeologists, who judge the age of an implement entirely by its shape, would have assigned to the Moustier period.

But it is also quite possible that the tools I have alluded to may have come originally from the lower stratum, and been transported to the higher level. Apart from the supposition that the deposit had been disturbed, there is another explanation : these implements of the elephant layer may have been found after this stratum had ceased to be formed, and carried

into the cave during the formation of the reindeer layer. A fact which I noticed in March 1899 will explain how this may have happened.

On examining the different layers which

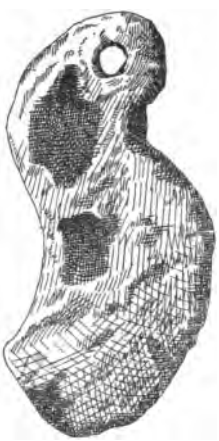


FIG. 35. — Ankle bone of deer used as a pendant.

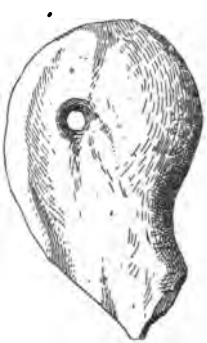


FIG. 36. — Pendant made from the end of a collar bone.

have accumulated in the cave, it will be noticed that they slope downwards towards the entrance. We may thus conclude that the opening offered no barrier to the shelving deposit, some of which would slide out, so that the detritus, which was gradually filling up the cave, would always end at the mouth in

a sort of talus, the lower layers projecting beyond the upper ones. Thus the lower stratum, being easily accessible at the mouth of the cave, it is quite probable that the people who sheltered there people who sheltered there may have had their attention attracted by objects protruding from the earth, and may have

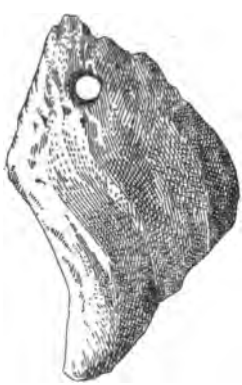


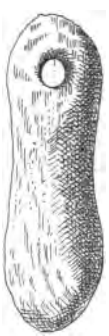
FIG. 37. — Epiphysis made into a pendant.

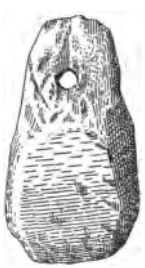
FIG. 38. — Fragment of a bone cut out as a pendant.

carried them into their dwelling. I am the more inclined to believe this since I have myself obtained specimens of a primitive type and fragments of breccia at a comparatively high level. Now, these fragments were isolated in loosely compacted soil, and several of them

greatly resemble those found in the elephant layer.

B. — *Bone Implements and Ornaments.* — The bone implements from the reindeer layer are few. Besides the "pointe" with split base already mentioned, they consist of *awls* and *polishers* on which it seems needless to enlarge.





FIGS. 39 - 40 — Bone pendants slightly polished.

The ornaments in bone and shell are sometimes of a very rudimentary type. Several of them were drawn for my first work, and I here reproduce these figures which will dispense with the necessity for a detailed description. The ankle bone of a deer (fig. 35), the end of a collar bone (fig. 36), or the epiphysis of any long bone (fig. 37), were considered as ornaments when once a hole had been bored to hang them by. These pendants were sometimes

roughly cut (fig. 38), or slightly polished (fig. 30, 40). In other cases a bone had been sawn across in two places close to one another and thus a ring obtained which could be easily hung (fig. 42). Finally, the bone was often replaced by a sea-shell which we recognise as a pendant only by the hole bored in it.

FIG. 41. — Ring sawn out of a bone.

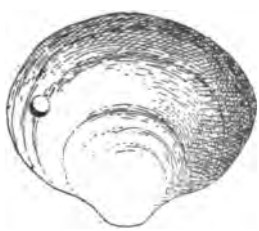


FIG. 42. — Shell pendant.

When the drawings of these bone pendants were published for the first time in "*l'Anthropologie*", some archaeologists, judging merely from the figures, insinuated that the pendants were not genuine. Now, I myself disengaged these objects from a very hard matrix which no forger could have made. A fragment of the diaphyse of a long bone, not mentioned before, had some parallel striae scratched transversely on the embedded side: these lines showed on the cast, to which the bone adhered so tightly that I broke it in separating them.

In spite of this, a savant of whose ability I have a high opinion, assured me, after examining these pendants with a magnifying glass, that one of them showed undoubted traces of having been cut with a metal saw. Twelve years later another scientist, for whom I entertain high regard and sincere friendship, asked me to show him these same specimens. After brushing and thoroughly cleansing them, he said that one or two specimens appeared to him doubtful, but that the others seemed genuine. Now, among those which he considered genuine was the identical pendant which my other friend declared had been worked with a metal instrument.

I mention this only to show how difficult it is even for an expert to speak with absolute certainty. For my part, having disengaged these objects with my own hands, I still persist in regarding them as the work of the ancient troglodytes of the Baoussé-Roussé.

In the other caves M. Rivière found the same bone implements and the same shell ornaments, all of which he describes in great detail and most of which he figures. Besides *awls* and *polishers*, he mentions *poignards*, which are really only large awls; flat "pointes" sometimes split at the base to facilitate fastening to the shaft, and identical with those mentioned above from the cave of Aurignac; long narrow "pointes", with the base cut like a chisel so as

to be easily inserted into a cleft in the handle; implements pointed at both ends and polished all over; and lastly *bone needles*. Some phalanges of the reindeer, bored on one side as far as the hollow centre, have long been regarded by archaeologists as *whistles*.

Some of these objects were not found in the Barma-Grande. But this cave contained fine examples of ornaments made of deer's teeth decorated with striae; of bone cut into the shape of a double-olive and decorated with lines; of ivory similarly worked; as well as the remarkable necklet formed by a dainty arrangement of deer's teeth, fish vertebrae, and shells of *Nassa neritea*, found with the skeletons. These constitute a collection far superior to that from any of the other caves, but as they have been described in the paragraphs devoted to the first discoveries made in the Barma-Grande, I need not again enlarge upon them.

Although many of the ornaments found in the Barma-Grande are finer and better decorated than those of the neighbouring caves, they do not seem to belong to a different period. Considered as a whole, the human handiwork found in the layers above those containing a sub-tropical fauna shows the same general characteristics. Perhaps the superiority which I have just mentioned may be attributed to a more highly developed artistic sense in the

family whose remains M. Abbo has unearthed in the course of his excavations.

C. — Engravings and Carvings. — The reindeer men have left proofs of their artistic instinct nearly everywhere in Western Europe, and it would be surprising had those dwelling at the Baoussé-Roussé been an exception to this rule. Yet it was thought until a few years ago that they produced nothing artistic. M. Rivière stated before the Anthropological Society of Paris (1) that among the one million and forty thousand objects collected by him in the caves of the Rochers-Rouges he had found only three bones engraved with lines. I have mentioned several cases of striae scratched on deer's teeth or on ornaments in bone or ivory. But it would be an exaggeration to term these very rude scratchings specimens of artistic work.

M. Salomon Reinach has brought to our notice (2) objects of a widely different interest, and which I cannot pass over in silence since they come from the Barma-Grande. They were bought in 1896, by the Museum of Saint-Germain, from M. Julien, who as we know had carried on excavations in the cave twelve years

(1) Bull. de la Soc. d'Anthropologie de Paris, 4e série, T. IX, 1898, p. 152.

(2) Salomon REINACH, Statuette de femme nue découverte dans une des Grottes de Menton, In L'Anthropologie T. IX, 1898 (avec 4 figures et 2 planches).

before. At a depth of from twelve to fifteen feet he is supposed to have found a statuette, also "a hemispherical object in steatite, ornamented with incisions, and another in schist of an oblong shape, with incisions on both surfaces". At this level we ought still to be in the reindeer layer, which seems to have attained a considerable thickness in the Barma-Grande. Moreover M. Julien declares that he found numerous flint gravers together with these objects. Here is M. Reinach's description of the statuette.

"The material is a yellow and somewhat translucent steatite, badly damaged in several places. The height is 1.8 inches, the maximum thickness .4 inch. The lower part of the legs is wanting. The head is oval with receding forehead : no features can be distinguished. A mass of hair falls onto the back of the neck, reminding one forcibly of the arrangement of the hair in certain primitive Greek statues. The arms are not indicated." (1).

M. Reinach's article surprised some savants who are disposed to condemn as spurious specimens which they do not describe themselves. How, they ask, could twelve years have

(1) Here follow anatomical details of little interest to the general reader. M. Piette is quoted to the effect that this statuette from the Baoussé-Roussé has certain features in common with one discovered by him at Brassempouy. (L'Anthropologie, 1895, pl. VIII, fig. 1a, 1b and L'Anthropologie T. IX, 1898, p. 30.). Translators' Note.

elapsed without the existence of this statuette being known ? M. Julien has answered this question beforehand by confessing that, acting upon advice given him, he had concealed the discovery "for fear of making the other finds in the cave appear less ancient". Besides, he was often called away to Canada and did not attach much importance to the collection which he had made. It was only in 1896 that he showed the objects to Messrs Reinach and de Villenoisy, little realising their interest. These were afterwards purchased by the Saint-Germain Museum.

M. Rivière, who has not seen the image, thinks that it is not genuine because some specimens bought by Baron Bruining in 1892, for the Museum of Riga, and said to have been discovered in the caves of the Rochers-Rouges, proved to be spurious ! But if "the antiquity of the statuette, said to be from Mentone, the authenticity of which is contested by some and upheld by others, were definitely confirmed, it would still remain to be proved that it was really found in one of the caves of the Baoussé-Roussé. (1). It is absolutely impossible to believe that a common workman should have made a counterfeit as perfect as the one bought by the Museum of Saint-Germain. The statuette is too like those discovered in deposits

(1) Bull. de la Société d'Anthropologie de Paris, 1898, p. 153.

of the Quaternary Epoch to admit of such an origin. If it is genuine, why should not the vendor have found it in the Barma-Grande which he partially excavated, as M. Rivière knows full well ?

M. G. de Mortillet strongly contested the antiquity of this image, adducing such arguments as the following. He believed that the statuette was made by a forger, and carried for a long while in his pocket in order to produce the patina on it, and wear off the traces of its having been cut with a steel knife. (2). But the chief reason for his doubting its genuineness is the fact that certain parts of the body are exaggerated. Thus he would have us regard this figure as an indecent image fabricated by a dishonest person who, in order to attract the attention of amateurs and purchasers, has absurdly distorted the figure. (2). On this supposition the statuettes found by M. Piette at Brassempuy would also be spurious, for they show a similarly exaggerated development; indeed this archaeological expert has compared them to Hottentot women.

M. Salomon Reinach has answered the objections of G. de Mortillet in a letter published in l'*Anthropologie* (3) and I think that for the

(1) Let us remark *en passant* that if these "traces of its having been cut with a steel knife" have *disappeared* there is nothing to prove that they ever existed.

(2) Bull. de la Société d'Anthropologie de Paris, 1898, p. 150.

(3) Cf. L'Anthropologie, t. IX, 1898, p. 613.

impartial-minded the question is settled. Therefore I do not hesitate to affirm that the men who lived at the Baoussé-Roussé during the reindeer age had the same artistic instincts as their contemporaries in the south west of France.

Since the Museum of Saint-Germain-en-Laye acquired this steatite statuette, the late Eduard Piette bought five more from this same M. Julien. These, he said, were found in a little cave just above the sixth large cave of the Baoussé-Roussé. Nothing is known about the human handiwork accompanying them. These statuettes, four of which are of crystalline talc, and one of bone, were presented to the Anthropological Society of Paris at their meeting on November 5th, 1902. Piette, whose imagination is never at fault, recognised the Neanderthal type in one of these, and the Bushman or Somali type in the others. They are all smaller and not as well carved as the Brassempouy images, but the style is similar.

To the loss of our science, Gabriel de Mortillet was taken from among us four years before the day on which Piette presented these statuettes from the Baoussé-Roussé to the Anthropological Society; but his son Adrien was present, and, adhering to his father's opinion, questioned the genuineness of the specimens. M. Rivière declared that he could only repeat what he had already said in 1898. M. Capitan,

on the contrary, considered the images genuine, insisting on a point mentioned by M. Piette, viz: that the statuettes, like other specimens found in the caves, showed traces of peroxide of iron in the depressions on their surfaces.

It would certainly have been much more satisfactory if, instead of these indirect proofs of authenticity, the statuettes had been discovered in the presence of witnesses, and not hidden by the finder for so many years without a hint of their existence. Nevertheless, their close resemblance to other Quaternary carvings of undoubted genuineness is an argument strongly in their favour. And I repeat it is not at all surprising that men belonging to the same race as the reindeer hunters of the Vézère — men with the same type of handiwork and mode of life — should have been gifted with the same artistic intincts as their western contemporaries.

III. — Upper Layers.

We know little about the character of the upper layers of the caves of the Rochers-Rouges. The reasons for this have already been mentioned. It will be sufficient for me to recall the fact that these layers were generally examined with little care, and that the upper deposits had in many cases been removed before those excavations, about which we have

reliable information, were undertaken. I will add nothing to what I have already said, (1) for I think I have clearly shown that the caves contained at the surface a neolithic layer of some depth, in which were found among other things, polished stone axes. And this could not well have been otherwise, for it is impossible to suppose that the formation of the deposit ceased suddenly at the end of the Quaternary Epoch ; and if man continued to inhabit these caves he must necessarily have left in them some relics of his handiwork.

(1) See Chap. I. p. 70.

CHAPTER IV

Physical Characteristics of the Men of the Baoussé-Roussé

When the first edition of this little book appeared a considerable number of human skeletons had been unearthed from the caves of the Baoussé-Roussé. These bore a very close resemblance to each other, and I wrote thus about them at the time : — "What strikes one most is the remarkable absence of variation in the tribe which inhabited this spot." Since then, however, fresh discoveries have been made which have obliged me to modify my former opinion to some extent.

The type first found in the Rochers-Rouges has been met with again in the Children's Cave, the new skeletons presenting all the characteristics of the earlier ones.

Thus the descriptions of this race which I have written at different times have been confirmed by the discoveries of le Chanoine de Villeneuve. But, in the same cave, this conscientious excavator has discovered two other skeletons. These lay 27 inches below one of the type first found, but differed from it totally in character. The interest aroused by this discovery will not admit of my passing it over in

silence, more especially as I was the first to describe the negroid race to which these two individuals belong. As the type revealed by the discoveries of MM. Rivière, Julien and Abbo had come to be called after the Baoussé-Roussé, it was necessary in order to avoid confusion, to find a new name for this race, met with now for the first time. I have therefore called it "The Grimaldi Race", because the Rochers Rouges are situated in the commune of Grimaldi, and it is customary to name new prehistoric types after the locality where they are first found. The Grimaldi Race is now well known to scientists. I will begin this chapter by describing its characteristics.

I. — The Grimaldi Race.

I have already said, in describing the curious positions of the two skeletons from the lower levels of the Children's Cave, that one was that of a youth 15 to 17 years old, and theo ther that of an old woman. According to M. Boule these remains date " from the Middle Pleistocene and would therefore be approximately contemporary with those of Spy, in Belgium"(1). The remains of the woman and youth resemble each other so exactly that they undoubtedly belong to the same ethnical type : they show

(1) M. BOULE, Op., cit., p. 181.

marked analogies with the Negro of the present day. The following are their most salient characteristics.

The *Stature* of the old woman, calculated from the long bones, was 5 ft 2 1/2 inches to 5 ft 3 inches; this is nearly an inch taller than the average Parisian woman of today. The youth was 5 ft 1 1/2 inches, but was not yet full grown. If we suppose that he might have grown another eight inches, as is usual among youths of his age at the present day, he would have stood about 5 ft 9 inches which is well above the average (5 ft 3 inches) in France. We shall see that the men belonging to the first-discovered type were much taller than this.

In the *proportions of their limbs* our two Negroids differ completely from the modern European, but they correspond very closely with the Negro, some of whose characteristics they even exaggerate. The forearm of the Negro is very long in proportion to the upper arm, the lower part of the leg long in proportion to the thigh, and the whole leg is long in comparison with the arms. Calculating the different proportions from the bones we obtain the following results :

Relation of radius (forearm) to humerus (upper arm).

Old woman from the Children's Cave.....	80.07
Youth » » »	79.37

European (according to Broca)	73.93
Negro » »	79.40

Relation of tibia (lower part of leg) to femur (thigh).

Old woman from the Children's Cave	83.87
Youth » »	83.77
European (according to Broca).....	79.72
Negro » »	81.33

Relation of arm to leg.

Old woman from the Children's Cave	65.66
Youth » »	63.12
European (according to Broca)	69.73
Negro » »	68.27

An examination of the above figures shows that the old woman is of an exaggerated Negroid type. The youth also, who is identified with the Negro by the length of his forearm as compared with the upper arm, has the lower leg relatively longer than theirs, and the whole leg exceptionally long in comparison with the arm.

In the character of their *heads* our two Negroids show a close resemblance to the Negro of today. They have, however, one peculiarity rare among existing human groups, viz : — the striking disproportion between the cranium, which is very long (hyper-dolichocephalic, as anthropologists call it), and the face, which is low and very broad.

The cranial capacity is large ; calculated approximately from external measurements it would be about 1,375 cubic centimetres for the old woman, and about 1,580 for the youth. The skull shows a very irregular elliptical outline, without any undue prominence of the parietal eminences so general among Negroid races. As in these, the sutures are remarkably simple. The forehead is relatively broad, and there is a flattening behind the vertex.

It is in the face that we see the most pronounced Negroid characteristics. Both jaws are strongly prognathous, and the chin is in consequence receding : this is more noticeable in the youth than in the woman. The nose is broad and its lower wall, instead of terminating in front in a sharp edge, ends in channels which continue on the outer surface of the upper jaw. The lower jaw is thick, narrow, and elongated from back to front.

The teeth of the old woman are too worn to be studied to advantage : but this is not the case with those of the youth which Professor Gaudry, an eminent "membre de l'Institut", has described with scrupulous care. These teeth are large. In the antero-posterior elongation of the molars and in the supplementary tubercles on them, they resemble those of the lowest Negroids of today, vis : the Australian Aborigines.

All the facial characteristics which I have

sketched above are essentially Negroid. Nevertheless there are certain features which distinguish our Negroids from most of the Blacks of today. I have said that the face is very broad. This, however, applies only to the upper part, for below the cheekbones it narrows in a remarkable manner. The orbits are low and very broad. We know of one group only among the negroid races of today in which these same facial peculiarities are to be found: this is the Bushman and Hottentot group, miserable tribes which are but little more highly developed than the Australian Aborigine.

The *pelvis* of the Negroids from the Children's Cave has, like that of the Negro, the ilia but little developed: these are, moreover, more vertical than in the modern European and the crest is strongly curved. Finally, we notice that the heel projects considerably behind the astragalotibial joint (lark-heel); and this again is characteristic of negroid races.

Such then are, briefly, the principal characteristics of this curious race. Owing to the discoveries in the Baoussé-Roussé it is now certain that we must reckon negroids among our ancestors. For it cannot be supposed for a moment that in the middle Quaternary Epoch this old woman and youth could have migrated from Africa to the Rochers-Rouges. It was not until many centuries later that man made his first attempts at navigation, and even in neoli-

thic times he was far from being in a position to brave the open sea. Moreover we have proofs that our Negroids of Grimaldi must have belonged to a race of some importance in Western Europe. Had they come hither accidentally they would have been absorbed in the existing population, and all traces of them would have disappeared. But this is not so. We know that in obedience to the law of atavism the characters of a remote ancestor may suddenly reappear in an individual. In view of this fact I have sought for traces of the Grimaldi type, and I have found them, in small numbers naturally, in France, Switzerland and Italy, in the Neolithic, Bronze, and Iron Ages, as well as in the present Epoch. I have even had the good fortune to meet with two living individuals with strongly marked characteristics, natives of the Piedmontese mountains. The sporadic appearance, at the present day, of this type in districts where Negroes can hardly be supposed to have penetrated, is proof of its former presence and wide distribution in Europe. The existence of this negroid race is now demonstrated : future discoveries may perhaps reveal its area of distribution.

II. — The Cro-Magnon Race.

This type has been known to us since M. Rivière's discoveries, and the finding of

the five additional skeletons by M. Abbo in the Barma-Grande has filled many gaps in our knowledge.

One of the four skeletons unearthed by le Chanoine L. de Villeneuve in the Children's Cave, also shows all the essential characteristics of the Cro-Magnons. We are therefore now in a position to give a much more accurate account of this race than hitherto.

A. — *Stature.* — This race was certainly tall; although the height has been greatly exaggerated. Inquisitive people, armed with tapes, have measured the height of the skeletons from the top of the head to the tip of the toes without troubling as to whether the bones were in their proper position, or whether the feet were stretched out. This is how the figure of 7 ft 6 inches was arrived at for the first skeleton found by M. Abbo.

A sculptor, M. Mégret, employed a method which is not new, and which has been discarded by all men of science. (1) To estimate the stature anthropologists now rely upon the relation which exists between the length of the long bones of the limbs and the total height of the body. M. Mégret bases his system upon the relation between the 2nd phalanx of the middle finger and the total height, of which this phalanx is said to represent the sixty-

(1). A. MÉGRET. Études de mensurations sur l'homme préhistorique. Nice, 1894.

fourth part. He obtains results of surprising precision : — 6 ft 6.55 inches for the skeleton discovered in the Barma-Grande on January 12th, 1894; 7 ft 0.9 inch for the one found in the same cave in 1892 : 6 ft 6.56 in, 6 ft 4 in and 6ft 9.1 in for the three found by M. Rivière. Now nothing varies more in different individuals than the length of the fingers, and I will show that the men of the Baoussé-Roussé had comparatively short ones. Moreover, a mistake of one single millimetre in measuring the 2nd phalanx will result in a total error of 64 millimetres (2.5 inch). Hence it is impossible to place any reliance on M. Mégret's figures.

M. Rivière does not tell us what system he employed to estimate the height of his skeletons, or rather he forgets to mention the coefficients used by him. They were certainly not those which M. Manouvrier deduced from the measurements of Dr. Rollet, for these had not then been published. The figures given are as follows :

Man of the Grotte du Cavillon	6ft 1 in, to 6ft 3 in.
First male skeleton of the Baousso da Torre.....	6ft 7 in, to 6ft 9 in.
Second » » »	6ft 5 in, to 6ft 7 in.

These figures are certainly too high. For if we re-estimate the height, with the aid of M. Manouvrier's coefficients, by taking the length of the long bones mentioned by M. Ri-

vière in his book, we obtain the following results.

Skeleton from the Grotte du Cavillon.

Length of Bones		Stature	
Humerus	342 mm.	1 m. 71	(or 5ft 7. 7 in)
Ulna.....	283 —	1 — 77	(- 5ft 10. in)
Radius	263 —	1 — 76	(- 5ft 9.69 in)
Femur.....	464 —	1 — 69	(- 5ft 6. 9 in)
Tibia	412 —	1 — 79	(- 5ft 10.88 in)
	Average	1 m. 74	(5ft 8.9 in)

instead of 1 m. 85 (6ft 1.2 in) to 1 m. 90 (6ft 3.2).

First Skeleton from the Baousso da Torre.

Humerus	365 mm.	1 m. 82	(or 6ft —)
Ulna.....	300 —	1 - 85	(- 6ft 1.26 in)
Radius	280 —	1 — 85	(- 6ft 1.26 in)
Femur.....	535 —	1 — 89	(- 6ft 2. 8 in)
Tibia	420 —	1 — 83	(- 6ft .46 in)
	Average....	1 m. 85	(6ft 1.26 in)

instead of 2m. (6ft 7.2) to 2m. 05 (6ft 9.1 in).

Second Skeleton from the Baousso da Torre:

Humerus	363 mm.	1 m. 81	(or 5ft 11.67 in)
Ulna	292(?) —	1 — 82(?)	(or 6ft — in)
Radius	264 —	1 — 77	(or 5ft 10. in)
Femur.....	504 —	1 — 79	(or 5ft 10.88 in)
	Average....	1 m. 80	(6ft 1.2 in)

instead of 1 m. 95 (6ft 5.2 in) to 2 m. (6ft 7.2 in)

I have a serious objection to make with regard to the heights given by M. Rivière. He

does not hesitate to insert exact figures in his tables, even whilst admitting in the text that the bones with which he is dealing are incomplete. By accepting these hypothetical measurements we obtain, as has just been shown, statures considerably less than those which he mentions, and the difference varies between six and eight inches.

I have been able to measure more accurately the bones of the skeleton from the Grotte du Cavillon which is in the gallery of the Paris Natural History Museum. The results show this man to have been 5 ft 9.3 in.

Since the publication of the first edition of this book I have finished digging out the skeletons of the Barma-Grande and have restored the bones. I have also carefully re-examined those previously mended and have corrected the mistakes then made. This work once completed I was in a position to measure a larger number of bones : the results differ slightly from those I obtained in 1899, but they should be more accurate. The following tables give the measurements of the two adult male skeletons of the Barma-Grande (1), and the third those of the tall man from the Children's Cave.

(1) The charred skeleton has been omitted, for although it was that of an adult, and undoubtedly of the Cro-Magnon type, no accurate measurements could be taken from it.

First male skeleton from the Barma-Grande.

	Length of bones		Stature.
Humerus,	right, 374 mm.	1 m. 84)	
»	left, 379 »	1 » 87)	1 m. 855 or 6ft 1.458 in.
Ulna	left, 310 »	1 » 94	1 m. 940 or 6ft 4.824 in.
Radius,	left, 286 »	1 » 92	1 m. 920 or 6ft 4.032 in.
Femur,	right 532 »	1 » 88)	
»	left, 526 »	1 » 86)	1 m. 870 or 6ft 2.052 in.
Tibia,	right 436 »	1 » 88)	
»	left, 432 »	1 » 86)	1 m. 870 or 6ft 2.052 in.
Fibula,	left, 420 »	1 » 84	1 m. 840 or 6ft 0.864 in.
		Average...	1 m. 880 or 6ft 2.448 in.

Second male skeleton from the Barma-Grande.

	Lenght of bones.		Stature.
Humerus,	right, 354 mm.	1 m. 76)	
»	left, 350 »	1 m. 75)	1 m. 755 or 5ft 9.498 in
Ulna	right, 290 »	1 m. 84)	
»	left, 287 »	1 m. 785)	1 m. 800 or 5ft 11.280 in.
Femur,	left, 491 »	1 m. 755	1 m. 755 or 5ft 9.498 in.
Tibia	rigth, 402 »	1 m. 76)	
»	left, 398 »	1 m. 75)	1 m. 755 or 5ft 9.498 in.
Fibula,	left, 388 »	1 m. 73	1 m. 730 or 5ft 10.092 in.
		Average...	1 m. 770 or 5ft 10.092.

Tall male skeleton from the Grotte des Enfants:

	Length of bones.		Stature.
Humerus,	right, 369 mm.	1 m. 84)	
»	left 365 »	1 m. 83)	1 m. 835 or 6ft 0.666 in.
Ulna	right, 310 »	1 m. 95)	
»	left. 303 »	1 m. 91)	1 m. 930 or 6ft 4.428 in.
Radius,	left, 279 »	1 m. 88	1 m. 880 or 6ft 2.448 in.
Femur,	right, 523 »	1 m. 85)	
»	left, 522 »	1 m. 85)	1 m. 850 or 6ft 1.260 in.
Tibia,	right, 448 »	1 m. 94)	
»	left, 450 »	1 m. 95)	1 m. 945 or 6ft 5.022 in.
Fibula,	left, 434 »	1 m. 90	1 m. 900 or 6ft 3.240 in.
		Average...	1 m. 890 or 6ft 2.844 in.

From my own observations I am inclined to think that M. Manouvrier's coefficients give too low an estimate when dealing with very tall individuals, and that to obtain the real height about five centimetres (2 inches) should be added to the results. By this means we get, as a final result, the following figures :

Stature of male Skeletons of the Cro-Magnon type found in the Baoussé-Roussé.

	From M. Manouvriers coefficients	Amended
Man from the	Grotte du Cavillon 1"75 (5ft 9 in)	1"80 (5ft 11in).
» »	Barma-Grande (n° 2) 1"77 (5ft 10 in)	1"82 (6ft --).
» »	Baousso da Torre (n°2) 1"80 (5ft 11 in)	1"85 (6ft 1in).
» »	Baousso da Torre (n°1) 1"85 (6ft 1 in)	1"90 (6ft 3in).
» »	Barma-Grande (n°1) 1"88 (6ft 2 in)	1"93 (6ft 4in).
» »	Children's Cave 1"89 (6ft 3 in)	1"94 (6ft 5in).
	General average 1"82 (6ft)	1"87 (6ft 2).

Calculated by the same method, the height of the woman from the Barma-Grande, who was not yet full grown, was 5ft 5.3 inches ; this is also the height of the 15 year old boy.

We have here, then, a race which is taller than any now existing, for neither the Patagonians, nor the Cheyennes, nor the Polynesians can show an average height of 6ft 2 in, or even 6ft.

B. *Proportions.* — On closer examination of the figures obtained for the height by using either the humerus, the ulna or the radius we find that the first gives a lower result than the

others. Hence we may conclude that the upper-arm is short in comparison wih the fore-arm, or conversely that the fore-arm is long in comparison with the upper. It will be found interesting to calculate the relation of the different bones of the same limbs to each other, and that of the arm the leg. I have done this in a few cases, with the following results.

Relation of the radius (fore-arm) to the humerus (upper arm).

Man from the Barma-Grande (N° 1)	75.48
» » Grotte du Cavillon	76.31
» » Children's Cave	76.44
European, (according to Broca)	73.93
Negro, (according to Broca)	79.40

According to this table these skeletons would occupy an intermediate position between the Negroid and European races of the present day.

Relation of the tibia (lower-leg) to the femur (thigh).

Man from the Barma-Grande (N° 1)	81.20
» » » » (N° 2)	81.54
» » Children's Cave	85.44
» » Grotte du Cavillon	85.96
European, (according to Brocca)	79.72
Negro » »	81.33

These measurements show a more than negroid development of the lower limb.

Relation of the arm to the leg.

Man from the Children's Cave	66.05
» » Barma-Grande (N° 1)	68.98
» » Grotte du Cavillon.	69.00
European, (according to Broca)	69.73
Negro, » »	68.27

Here we find that the individual from the Grotte du Cavillon approaches the European type; whereas the man from the Barma-Grande (N° 1) resembles the Negroes; while the skeleton from the Children's Cave has an arm relatively shorter, or conversly, a leg relatively longer, than all existing negroid races.

Similar calculations based upon the collar bone would prove the three men from the Baoussé-Roussé to be allied to the Negroes; but the two skeletons from the Barma-Grande would, on the contrary, approach nearer to the European type, and one of these (N° 1) even exaggerates their characteristics.

Additional figures will not be given here as they will be found in my work on the "Grottes de Grimaldi". I will merely mention that in proportion to the stature the hand is exactly as long as that of a Frenchman of today, and that the foot is especially noticeable for the projecting heel (lark heel).

There is, however, one point which has already been alluded to *en passant*, and to which I must revert in order to prove how unsatisfactory is the method used by M. Mégret

in calculating the stature. Athough the hands of the men of the Baoussé-Roussé are proportionately of the same length as ours, it does not follow that they are morphologically similar. The metacarpus of our troglodytes was long and the fingers very short, and this shortening is as much in the proximal as in the second and distal rows of phalanges. Let us take as an example the middle finger and see what is the relation of a phalanx of the second row to the stature.

Relation of the 2nd phalanx of the middle finger to the stature :

Modern Frenchman.....	1.75 o/o
Man from the Barma-Grande (No 1)	1.65 o/o
» » Children's Cave.....	1.60 o/o

In order to arrive at the stature it would be necessary to multiply the length of the 2nd phalanx by 57.1 for the Frenchman, and by 62.5 for the man from the Children's Cave. It seems unnecessary to insist further upon the utter uselessness of such a method.

These tall men from the Baoussé-Roussé were also very strongly built. All their bones show the insertions of very large and powerful muscles ; for instance, the end of the humerus of the first skeleton discovered by M. Abbo measures

65 millimetres (2.5 in) in width, and the femur is 85 millimètres (3.3 in) in width, at its lower end.

The femur, in particular, shows evidence of exceptional muscular development. It is well known that the posterior edge of this bone is very rough, hence it has been called *linea aspera* (1). Here are attached the vasti, the gluteus maximus, the three adductors, the short head of the biceps, the gemellus internus and the plantaris. The more these muscles are developed, the more prominent is the linea aspera. Now in the men of the Baoussé-Roussé this forms quite a ridge, and in the charred skeleton it projects as much as a centimetre.

The femur is remarkable for several other peculiarities. Below the great trochanter there is a deep depression (trochanteric fossa); the bone widens here and at the same time is flattened from front to back ("platymérie"). M. Manouvrier considers that this condition may be said to exist when the relation of the antero-posterior diameter to the transverse diameter of the femur (measured below the trochanters) is not more than 80, and that this same feature is strongly marked when the re-

(1) The author evidently includes under the term *ligne âpre* not only the linea aspera of the English anatomical text books but also the gluteal ridge and the internal and external condylar ridges. (Translators' Note.)

lation is less than 65. Now in the left femur of skeleton N° 2 from the Barma-Grande, it falls to 54.

The tibia shows a remarkable peculiarity which has been called *platycnemism*. The bone is very powerfully formed, but flattened transversely to such an extent that the posterior surface almost disappears. In order to estimate this characteristic we ascertain the relation between the transverse and antero-posterior diameters, both measured on the level of the nutrient foramen. The tibia of the charred skeleton gave me the lowest index (57.14), and many others were below 60. Now in the skeleton of the old man found at Cro-Magnon, and considered as strongly platycnemic, this index is 63.

The fibula has very remarkable ridges and grooves. One groove measured 7 millimetres in depth (.27 in), an astonishing figure for so small a bone.

C. — *Head.* — The heads of these troglodytes of the Baoussé-Roussé have very marked characteristics which are as usual more pronounced in the men than in the women. One is at once struck by the lack of harmonious development between the skull and the face ; for while the skull is long from front to back, the face is both very short and very broad. This want of proportion, to which I have already drawn attention in the Grimaldi type, is still more marked in the Cro-Magnons.

The skull of the old man of Cro-Magnon, when seen from above, is distinctly pentagonal in outline; This is due to the remarkable development of the parietal eminences, and to the projection of the occipital protuberance. In profile the forehead shows a fine curve which is continued regularly as far as the parietal region. The parietal bones are flattened at the back, and the resulting depression extends as far as the upper part of the occiput ; this bone

FIG. 43. — Skull of the male skeleton discovered in 1892 (1/3 natural size).

then swells, forming a strongly marked protuberance. The base of the skull is unusually flat. I may add that the cranial capacity of this skull is most remarkable.

The great breadth of the face, already referred to, is due to the exaggerated development of the zygomatic arches, and is therefore confined to the upper part: the dental arch is, on the contrary, narrow. The superciliary

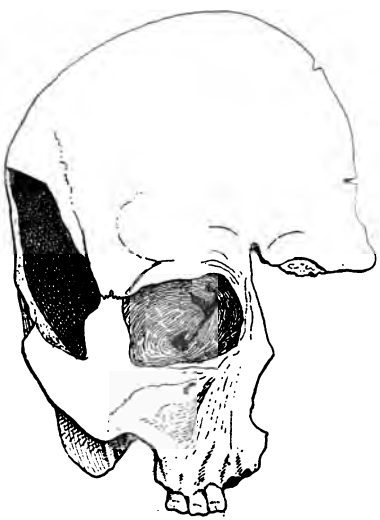


FIG. 44. — Skull ol the male skeleton discovered 1892 (1/3 natural size.)

ridges are very prominent near the nose; but on each side they fall away to the level of the external angular processes of the frontal bone. The orbits are rectangular, the corners being barely rounded. Not less striking is the narrow-

ness of these orbits as compared to their width. The orbitary index (that is the relation of the height to the width) is as low as 61.36, which means that the height hardly represents 61 per cent of the transverse diameter. The nose is somewhat narrow and projecting, and the upper jaw is rather prognathous in the dental region.

The lower jaw-bone is powerfully formed, its rami being unusually broad. Lastly we notice the triangular shape of the chin, and the condition of the teeth which are worn down almost to the roots.

Such are, briefly, the essential characteristics of the skull of the old man found in a rock-shelter at Cro-Magnon, in the Valley of the Vézère : and this man is the prototype of the race of Reindeer men.

Now the first adult male skeleton found by M. Abbo in the Barma-Grande has exactly the same cranial characters (figs 43 and 44), and were I to describe the skull I should but repeat the above description.

The other skulls from the Baoussé-Roussé also show most of these characters, (figs 45 and 46). The cranial capacity is always considerable and this is in keeping with the great stature of these people. The head also lacks harmony, the cranium being dolichocephalic and the face both broad and low. I have seen in two specimens the length of the head reach 206

and 211 millimètres, most exceptional figures for a human skull. The forehead is invariably well developed, and the orbits, in every case,

FIG. 45. — Skull of the male skeleton discovered in 1894.

are very wide, low and rectangular; the nose and dental arches are narrow, and the chin and whole lower-jaw powerful. The teeth are constantly much worn obliquely, and this is already noticeable in the youth found by M. Abbo.

But a variation from this type is met with among most of the skeletons from the Baoussé-Roussé. The parietal eminences are less deve-

FIG. 46. — Skull of the male skeleton discovered in 1894.

loped, and consequently the pentagonal outline becomes less marked, or even disappears. The occipital bone in the region of the inion, although enlarged, is not so prominent, and is less

compressed laterally, so that the boss is not so conspicuous. The base of the skull is rather curved than flat ; lastly the sub-nasal prognathism tends to disappear.

FIG. 47. — Skull of the female skeleton.

These differences, however, are not greater than the individual variations observed among even the purest human races, and will not warrant our differentiating the Baoussé-Roussé men from the Cro-Magnon type with which they are united by an imposing array of characteristics.

The skulls of the youth and the woman

show the same general features as those of the men, except for modifications due to youth or sex. Thus the woman (figs 47 and 48), although decidedly dolichocephalous (cephalic index 71.58)has not the parieto-occipital flattening,

FIG. 48. — Skull of the female skeleton.

nor the depression at the base which we have noticed in the other sex. The face is broad and low; the orbits are slightly rounded at the angles, but are still extremely wide as compared with their height (index 73.81).

D. — *Pelvis.* — A few words must be said about the pelvis, which had not hitherto been studied in the Cro-Magnon type because only very imperfect specimens had been found. I

have been fortunate enough to be able to examine two in a very good state of preservation : one is that of the tall individual unearthed in the Children's Cave by le Chanoine de Villeneuve ; the other that of the skeleton from the Barma-Grande which I have called N° 2 in this little book. I have also taken a few measurements of the iliac bones of skeleton N° 1 from the same cave, and of the rather badly preserved pelvis of the old man from the Valley of the Vézère. From these data I have drawn a few conclusions.

If we place the pelvis of the man from the Children's Cave beside that of the man from the Barma-Grande, we are at once struck by a difference which upon superficial examination appears to be fundamental. The first of these is much contracted below, so that the angle of the outlet of the pubic arch is very small, and the spines and tuberosities of the ischium project strongly into the interior of the cavity. The second pelvis, on the contrary, is much wider of outlet at its lower end, and the pubic arch is so wide that one would almost take the pelvis for that of a woman (fig. 50) ; and when looked at from above only a very short piece of the spine of the ischium is to be seen projecting into the pelvic inlet (fig. 49). Nevertheless this is the pelvis of a man, and its great strength, which is in keeping with the powerful development of the rest of the skeleton,

FIG. 49 - 50. — Pelvis of the male skeleton discovered in 1894.

leaves no doubt on this point. It is merely an abnormal pelvis, a case of partial feminism, like several I have met with among tall men, notably in the giant of the Natural History Museum of Paris. (1).

Disregarding the true pelvis we find that in the false pelvis our two specimens show striking analogies. Both are powerfully developed like the other bones of the skeletons. All the vertical and transverse diameters of the men from the Baoussé-Roussé are greater than those of the modern European ; on the other hand the antero-posterior diameters are less. The height being increased a little more than the breadth, the transverse-vertical index of the pelvis appears slightly greater, while the horizontal pelvic index is much lowered by reason of the reduction of the antero-posterior, and the increase of the larger transverse diameter. The index of the pelvic inlet suffers the same reduction as does the horizontal index of the pelvis bone, and for the same reasons. The internal iliac fossa is well developed in every way, and its upper edge, or crest of the ilium, shows a very perfect curve. The sacrum, of which all the measurements are increased, has the anterior surface less concave than that of the modern European.

(1) R. VERNEAU, *Le Géant du Muséum d'histoire naturelle de Paris*. This memoir appeared in a book by MM. P. E. Launois and P. Roy, called : Etudes biologique sur les Géants, Paris, 1904).

To enable the reader to grasp these differences two figures are given side by side, the one being the pelvis of a modern European — borrowed from a work I published in 1875 (1) — (fig. 51), the other a pelvis from the Baoussé-Roussé (fig. 52).

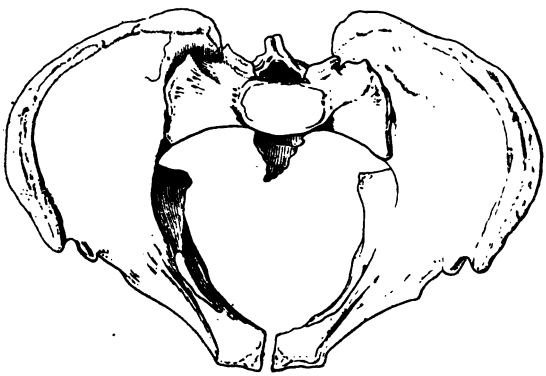


FIG. 51. — Pelvis of modern european.

It should be noticed that the pelvic peculiarities of the men of the Baoussé-Roussé who belong to the Cro-Magnon race, have absolutely nothing negroid about them. The pelvis of the Negro is narrow, and long from back to front; the iliae are much developed and are vertical; the crest of the ilium is sinuous, and the pelvic inlet very long. In the Cro-Magnons

(1) R. VERNEAU, *Le Bassin dans les sexes et dans les races*, Paris, 1875.

the reverse is the case, and so far from approaching the Negro in the structure of the pelvis, they and their representatives of the Baoussé-Roussé even exaggerate the characteristics of the European.

These men, who succeeded the negroid race of Grimaldi at the Rochers-Rouges were indeed

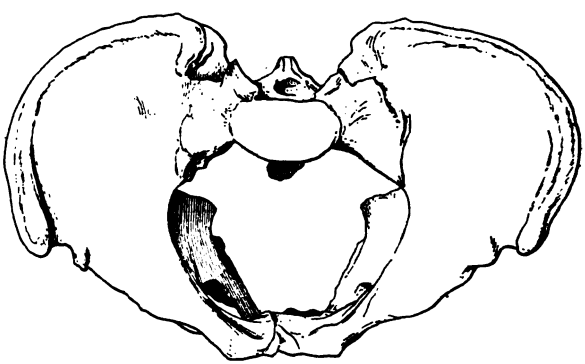


FIG. 52. — Pelvis of man the Baoussé-Roussé.

most peculiar. They have retained certain negroid characteristics such as the proportions of the limbs, and the projecting heel (lark heel). The disproportion of the cranium to the face, the parieto-occipital flattening, and the shape of the superciliary ridges, nose, and orbits, are also those of the negroids ; but they differ from these, as also from the existing inhabitants of Western Europe, in their great

stature, in their powerful development, in the narrowing of the nose and lower part of the face which is exceptionally wide in the cheek bones, in the peculiarities of the pelvis which I have just noticed above, in the projection at the posterior edge of the femur, and in the enormous transverse flattening of the tibia. (1)

I repeat that this race is unquestionably the same as that which peopled the Valley of the Vézère, where a skeleton of a type identical with it was discovered under a rock-shelter, known by the name of Cro-Magnon, in the "commune" of Eziez. This prehistoric race takes its name from the locality in which it was first met with.

The Cro-Magnons lived in the reindeer age, and probably still inhabited the southwest of

(1) I have not referred to the skeleton of a woman unearthed by le Chanoine de Villeneuve in the upper layers of the Children's Cave, at a level at which the reindeer is still found. Its bad state of preservation makes it difficult to distinguish the characteristics. We can only say that the woman was neither tall nor powerfully formed, and that the lower parts of the legs were long in proportion to the thighs. The skull was comparatively long and very high ; the forehead normal, the parietal eminences conspicuous, and there was a slight parieto-occipital flattening. Apart from the stature, the peculiarities just enumerated may be found in the negroid as well as in the Cro-Magnon types. The shape and size of the orbits might also be mentioned as a characteristic common to both these races. But this individual is clearly distinguished from these two ancient types by the length of the face, which is in harmony with that of the skull, and by the slenderness of the whole skeleton.

Europe during the period of transition between the Quaternary and the Present Epochs, for their persistence into the neolithic age has been proved. It is to these men then that we must attribute the human handiwork met with in the Barma-Grande in the layers immediately above those of the elephant; and to them belonged the artists who executed the numerous drawings and carvings at the end of the Quaternary Epoch. They were certainly represented at the Baoussé-Roussé, for we have found skeletons here showing all their physical characteristics; have collected innumerable tools bearing, so to speak, their trade-mark; and have even discovered their artistic productions.

It would seem that I might now bring this little sketch to a conclusion, and yet I have thought it necessary to devote one more chapter to the date of the interments, and another to a short recapitulation.

CHAPTER V.

Date of the Interments.

When it was said that the whole deposit which filled the Baoussé-Roussé Caves belonged, from the surface down to the bottom, to the same epoch, viz: the Quaternary, the upper layers were not taken into consideration; moreover an uncertainty remained which it will be as well to clear up.

The Quaternary Epoch was indeed long, though in point of duration it cannot be compared with those which preceded it. Nevertheless it was long enough for scientists to see fit to subdivide it. These subdivisions were necessary, for between the beginning and the end of this epoch the species of animals were considerably modified and human handiwork underwent remarkable improvement. I have mentioned at the beginning of this sketch that Lartet, from a palaeontological point of view, proposed four subdivisions; these are in order of antiquity: —

1. Period of the Cave Bear.
2. Period of the Mammoth and Woolly Rhinoceros (R. Tichorrhinus).
3. Period of the Reindeer.
4. Period of the Aurochs.

On the other hand G. de Mortillet's classifi-

cation is based principally upon the workmanship of the implements. This also contains four subdivisions. Beginning with the most ancient these are : —

1. The Chelles Period.
2. The Moustier »
3. The Solutré »
4. The Madeleine »

He has endeavoured to make these subdivisions harmonise, not only with the types of implements, but with the fauna, and also with the geological phenomena.

I prefer M. Boule's classification to both of these for it seems more in accordance with the facts.

M. Boule, like most geologists, includes the Present Epoch in the Quaternary. To this period, which extends from the beginning of the Tertiary Epoch to the beginning of the present time and is characterised by the fauna and flora of our day, he gives the name of *Pleistocene*. This he divides into three — lower, middle and upper.

The *lower Pleistocene* includes the fauna of a sub-tropical climate of which the most typical animals are the hippopotamus, *Elephas antiquus* and *Rhinoceros Merckii* : the human handiwork is that of the Chelles type.

In the *middle Pleistocene* we have a special fauna characteristic of a cold climate : — mam-

moth, the woolly rhinoceros (*R. Tichorrhinus*), cave bear, cave hyena, large cat or cave-lion, etc., all species now extinct. Man already worked bone, and his implements are of the Moustier type.

The *upper Pleistocene* also includes animals adapted to a cold climate, such as the reindeer, *Antelope saiga*, etc,— the present fauna of the steppes,— but all have now migrated from temperate Europe. The human handiwork is that of the Madeleine type, and is characterised by flint implements, generally small and of very varied shape ; also by numerous tools in bone, ivory and stag's horn. The dawn of artistic instinct is shown in drawings, carvings and paintings.

Can we assign the date of these interments to any one of these three periods ? At first sight it would seem as though the question admitted of no doubt. The first skeletons in the Barma-Grande were found above the layers containing remains of *Elephas antiquus* : it follows then that they must be of later date. They were lying in a stratum containing the jaw-bone of a reindeer, and on the same level as implements typical of the Madeleine period. Consequently we might suppose them to be contemporaneous with the reindeer, or at any rate would place them in Mortillet's Madeleine period, (that is M. Boule's upper Pleistocene), the time at which *Cervus tarandus* was most abundant in

Western Europe. Notwithstanding this I was still uncertain and, after having studied the question on the spot, I expressed the opinion in 1892 that the interments were not so remote as the Quaternary Epoch. The following are the principal arguments in support of my former theory. (1)

The skeletons were found in the middle of the reindeer layer, but the bodies had been buried in a trench, the posterior wall of which I distinctly observed. This trench must have been dug at a later period in a more ancient deposit.

The burial accessories are of a less primitive type than the implements and ornaments found in the undisturbed parts of the same layer, and even of those of higher levels. The large flint blades placed in the trench beside the bodies, and the bone awl found on the forehead of the skeleton now in the Paris Museum, have a Neolithic appearance. The small bone pendants denote a taste less crude than that of the artificers who made the clumsy pendants met with at a lower level, (see figs. 35 to 40).

On the other hand the absence of every kind of pottery, and of polished stone implements is against the supposition that the interments belong to the Neolithic Age proper. Hence I

(1) R. VERNEAU, *Nouvelle découverte de cadavres préhistoriques aux Baoussé-Roussé près de Menton. L'Anthropologie* t. III, 1892.

came to the conclusion that they dated from the beginning of the Present Epoch — the period of transition between Palaeolithic and Neolithic Ages. The Cro-Magnon race still inhabited western Europe at this period. This hypothesis seemed to me to explain all the facts.

My essay gave rise to a sharp controversy. Taken to task by a scientist of whose ability I have the highest opinion, but who had not visited the spot, (1) I replied with the ardour inspired by sincere conviction. The discussion soon ceased to be scientific, and I thought it as well to close it with the following words: "Fresh facts are necessary before we can renew this discussion ; without them we should only continue to make futile repetitions ". (2).

From that time until 1899 I wrote nothing further on the Baoussé-Roussé, excepting a short notice which appeared in the "Bulletin de la Société d'Anthropologie de Paris", after a presentation I had made to this society on May 5th, 1898. M. Rivière, who had not seen the object figured in my first memoir, did not

(1) E. d'ACY, *De l'âge des sépultures des grottes des Baoussé-Roussé*. Bruxelles. This memoir was read, on September 7th, 1894, at the "Congrès scientifique international des catholiques"; it appeared in October of the same year in the "Revue des questions scientifiques".

(2) This whole controversy will be found in *l'Anthropologie*, T. VI, 1895 (p. 153-159, 344-354, 488, 489).

hesitate to condemn them as spurious. Although I had disposed of this accusation, I was nevertheless anxious to submit the specimens themselves to archaeologists. My colleages were unanimous in pronouncing them undoubtedly authentic.

The differences of opinion which had arisen from the first rendered it incumbent upon me to examine the finds made by M. Abbo since 1892. In March 1899, therefore, I revisited the Rochers-Rouges in company with my friend and colleage M. Boule, who is known to all interested in geology, palaeontology and prehistoric archaeology, as an authority on these subjects. I was obliged to modify my first opinion slightly, and lost no time in publishing another article in our "Revue". (1)

Before explaining my former view I must recall certain facts.

The reader will remember that the skeletons discovered in 1894 lay more than five feet above the others. It is not known whether they had been buried in a trench, for no observations were made on this point. In any case the charred skeleton could have been buried only in a very shallow trench. The fact that the bones were all in their normal position indicates that the body was burnt on the spot; for if the cremation had taken place elsewhere, and the

(1) R. VERNEAU, *Les nouvelles trouvailles de M. Abbo dans la Barma-Grande, près de Menton. (L'Anthropologie*, t. X, 1899).

remains had been subsequently deposited in the trench, it is evident that the bones would not have been in their proper places. Thus the lower parts of the legs and the feet would not have been found below the thigh-bones and parallel to them, with all their bones in the normal position.

Now the cremation can have taken place only on the surface of the soil, or in a very shallow trench, for in a deep one combustion would not have been sufficiently active to consume the flesh and char the bones. We must therefore conclude that, at the time when the body was burnt, the cave was already filled up to the level at which M. Abbo discovered the skeleton.

All these interments appear to be contemporary. I have shown in the preceding chapter that all the skeletons of the Barma-Grande possess the same physical characters and that they belong to the same ethnical group : we have seen also that the burial accessories and ornaments found at the lower levels were identical with those of the upper. If then we admit that these interments were contemporary it follows that the three individuals discovered in 1892 must have lived when the reindeer layer had attained a depth of about five feet, for this layer continued beneath the skeletons.(1).

(1) I have mentioned the slight slope of the deposit towards the mouth of the cave; but this is not sufficient to bring the skeletons first unearthed on a level with those below.

But at this time the deer was abundant, and we might suppose, from the numerous remains of this animal and of other still existing species found at the same level as the last skeletons, that this layer dated from a more recent epoch than the Quaternary. But it is probable — nay even certain — that this is not so, for associated with the bones of *Cervus elaphus* were found, as I have said, those of a big stag resembling *in size* the Wapiti of Canada. This animal became extinct in Western Europe later. Moreover the human handiwork at this level is still of the Madeleine type. From all this I came to the conclusion in 1899 that these human remains dated from the Pleistocene epoch, but very near its end.

All the facts seemed easily explained by this theory. In order to bury the first bodies at the level at which they were found, the big trench, the posterior wall of which was still visible at the time of the discovery, must have been dug. And there is nothing surprising in this, for it was not necessary to dig a pit at least 24 feet deep, as M. d'Acy pretends, but merely a trench about the height of a man. My hypothesis as to the age of the skeletons also explained the difference between the flint implements found near the bodies and those found at the same level, but outside the trench. The first are flint blades as much as 10 inches in length, and 1.9 inches wide: while the latter

are remarkable for their small size. In the same way was explained the presence in the lower grave of those pretty bone pendants, so skilfully made, which it is impossible to regard as the work of the immediate successors of the men who fashioned the rough gritstone implements of the elephant layer.

And finally I was at that time convinced that the skeletons of the lower grave were not exactly contemporary with the layer in which they were found. But at the same time I drew attention to the fact that neither the large flint implements nor the ornaments accompanying these bodies were exactly neolithic in type. I had seen the double-olive shaped pendants, discovered after my departure, and re-examined the little pendants which I had figured in *l'Anthropologie*, and I was convinced, like M. Boule, that they bear a great resemblance to certain objects of the reindeer age. From all the reasons given above I then came to the conclusion that the skeletons discovered by M. Abbo had been deposited in the Barma-Grande towards the end of that Age.

However, in view of the conclusive evidence collected from the Children's Cave since the publication of the first edition of this little book I do not hesitate to alter my opinion. It is the duty of every man of science to search after truth ; and he, of all men, should be prepared to acknowledge his errors.

It must be admitted that neither the discoveries of MM. Rivière and Julien, nor those of M. Abbo were of such a nature as to afford a definite solution of this problem. This is proved by the long controversies among scientists which I have summarised in my book "*Les Grottes de Grimaldi*". The interments were considered by some as dating from early Quaternary times ; others regarded them as neolithic ; while others again assigned them to the transition period between the palaeolithic and neolithic ages. And all brought forward plausible arguments in support of their views. Obviously then new facts were needed to decide the question.

These new facts were supplied by the Prince of Monaco's excavations in the Children's Cave. I have already said how carefully and methodically le Chanoine de Villeneuve carried out this work. His discoveries show that the grave containing the two Negroids dates from the Middle Pleistocene, and the remains of the man of the Cro-Magnon type dates from a little later in the same Middle Pleistocene, lying as they did two feet above the Negroids. The reasons which led M. Boule to this conclusion need not again be given ; I will merely refer the reader to what has already been said on pp 64 to 70. Let us now see whether the human remains of the Barma-Grande can be assigned to the same date as those of the neighbouring Cave.

The interments discovered by M. Abbo can obviously be compared only with that of the tall male skeleton from the Children's Cave. The details already given prove that these individuals belong to the same type. Moreover there is a great resemblance in the mode of burial. We need only recall the fact that in both these cases a few stones had been placed near the bodies to protect them, and that the peroxide of iron, so abundant in the Barma-Grande, was also found near the big skeleton in the Children's Cave. The burial accessories were not so elaborate in the grave discovered by M. de Villeneuve as in the one containing three skeletons found by M. Abbo ; but we must not forget that though the skeleton (N° 2) unearthed by the latter lay at a higher level than the other three it did not possess the same variety of ornaments as they did.

Finally the human handiwork is practically identical in both cases : the only difference being the presence near the Barma-Grande skeletons of the three large flint blades already referred to ; but in spite of their size these implements do not show neolithic workmanship.

From all this we are inclined to believe that the interments in the Barma-Grande date from the same period as that of the tall man from the Children's Cave, that is from the Middle Pleistocene. But the presence of the reindeer

in the Barma-Grande at the same level as the skeletons leads me to consider them as a little less ancient, especially as M. de Villeneuve met with this animal only at a rather higher level in the Children's Cave.

Thus I am now convinced that all the skeletons of the Cro-Magnon type found by M. Abbo and by le Chanoine de Villeneuve are undoubtedly Quaternary. This race appeared at the Baoussé-Roussé at the end of the Middle Pleistocene as is shown by the discoveries made in the Children's Cave; and it continued to live there during the reindeer age as M. Abbo's finds have proved.

CHAPTER VI

Recapitulation and General Conclusions.

We may now present a short abstract of the conclusions which result from the facts detailed in the preceding chapters.

The Barma-Grande is of similar formation to the other caves of the Baoussé-Roussé. The limestone rock which forms its walls was originally deposited at the sea bottom, as is proved by the numerous marine shells which it contains.

When this rock-mass rose above the sea, doubtless towards the close of the Tertiary Epoch, the cave was quite empty; but it soon began to be filled up by materials introduced from without. In these earliest deposits of cave-earth were found the bones of large mammalia long extinct. Indeed we are now in a position to affirm that the lowest part of the Barma-Grande, like that of the Prince's Cave, contained the remains of animals belonging to a sub-tropical fauna: for M. Abbo has found there the bones of *Elephas antiquus* and *Rhinoceros Merckii*.

From this time onwards man inhabited the caves of the Rochers-Rouges. He sheltered in them and lived by hunting.

These troglodytes fashioned rude stone implements of which specimens have been found in their abode. They employed for this purpose the materials nearest to hand: gritstone and limestone were extensively used. Of these they made *scrapers*, *knives*, "*pointes*", etc. These implements and weapons are worked on one side only, like those characteristic of the so-called Moustier type: the other side remains smooth just as it was struck off from the block or core. Another thing characteristic of these implements is that they show none of the fine chippings or finish seen on the more recent handiwork. It is true that neither gritstone nor limestone is adapted to fine workmanship. But in the same elephant-layer flint implements were found, and these like the others are worked on one side only; also the clumsy way in which they are wrought shows but primitive skill on the part of the workmen who made them.

The deposits which succeed these lowest strata contain evidence that the sub-tropical fauna was gradually replaced by animals adapted to a cold climate. First we find remains of the cave-bear and the brown bear, felines and other large carnivora; lastly the reindeer appears together with a fauna similar to that now existing on the steppes.

This succession of animal types was distinctly observed in the Prince's Cave and in the

Children's Cave. In the Barma-Grande the intermediate fauna has not been so distinctly traced; but in this cave the remains of the reindeer were first recognised by M. Boule. It had previously been supposed that this animal did not extend to the southern slopes of the Alps.

Associated with the remains of the reindeer in this deposit were those of the following animals which occur more or less abundantly: Urus or wild bull (*Bos primigenius*), another ox, doubtless *Bison europaeus*, a goat differing somewhat from our present species, the roebuck (*Cervus capreolus*), the ibex (*Capra ibex*) the wild boar, (*Sus scrofa*), the horse (*Equus caballus*) and the fox (*Canis vulpes*). The red deer (*Cervus elaphus*), which already existed in the subtropical period, becomes much more plentiful at the higher level : with this animal was a larger deer resembling in size the Wapiti of Canada.

Man continued to inhabit the caves of the Baoussé-Roussé during the formation of the deposit in which the remains of all the above-mentioned mammals were found. There are numerous traces of human occupation at every level : weapons, stone implements, tools made of bone, ornaments, etc. At intervals we come across the hearths where fires were lighted. These spots are marked by a mass of ashes and charcoal in which charred bones often occur.

The presence of the bones of animals in these

caves is not due to mere accident : they were brought there by the cave-dwellers who hunted in the neighbourhood and came back laden with the quarters of the animals they had succeeded in bringing down. Doubtless the flesh was eaten cooked, which accounts for the charred appearance of some of the bones. Other bones were split in a systematic way so as to extract the marrow.

These men made stone or bone "*pointes*" for hunting. The stone used was nearly always flint. They had learned by experience that flint was far superior to gritstone or limestone for this purpose, and had given up using these latter materials. Moreover the hunter of the reindeer age had acquired a skill in working flint which his ancestors of the *Elephas antiquus* period did not possess. When he had roughly fashioned an implement, and was not satisfied with it, he would alter its shape and improve it by removing a number of small flakes from one or both surfaces. This finer workmanship is what characterises the stone implements of this period : in the Baoussé-Roussé they are all of small dimensions. Some of them were not worked. Thus when a flint flake was intended for use as a knife it was left in its original state for the edge would be destroyed by chipping.

Besides the flint flakes or *knives*, the following stone implements may be mentioned as occur-

ring above the level of *Elephas antiquus*: scrapers with single or double edge, *scraper-gravers*, *gravers*, *awls* and "*pointes*". All these belong to the socalled Madeleine type. I have described them at length in chapter III.

The existence of *gravers* among the flint implements proves that the men of this period also worked in bone. Indeed it would appear that this primitive material was in use from very early times, for the caves of the Rochers-Rouges have yielded "*pointes*" with cleft base identical with those of Aurignac. Among the bone implements mentioned above are *awls* and *polishers*.

But bone was not used only for ordinary weapons and implements: it was frequently employed in the manufacture of ornaments, such as pendants, etc. Ivory, canine teeth of the deer, vertebrae of fish, and sea shells pierced for the string were also much used for personal adornment by the troglodytes of the reindeer age.

These people carried their love of decoration to a considerable length. That they really had a certain artistic faculty is shown by their drawings and carvings. These, however, it must be admitted, are not very numerous. A small figure in steatite and two engraved objects, one in steatite the other in schist, were found in the Barma-Grande in 1884 by M. Julien who sold

them twelve years later to the Museum at St-Germain-en-Laye.

The statuette, only 1.8 inch high, is an undraped female figure with certain parts of the body abnormally developed. It bears a striking resemblance to the ivory statuettes found by M. Piette at Brassempouy in upper Pleistocene deposits. This learned archaeologist has since purchased from the same M. Julien some other statuettes in crystalline talc and in bone. These present the same features as the other : they are supposed to have been found in a small cave of the Rochers-Rouges. As to the other engraved objects, they are simply decorated with lines.

We do not know what was the depth of the deposit formed during the reindeer age in the Barma-Grande. The superficial layers were not systematically examined : and it was only after the discovery of the skeletons, which I shall mention presently, that scientific excavations were carried on in the soil which had not been removed. We know that in the Children's Cave this uppermost layer was of considerable thickness. Neolithic implements would probably have been discovered in the surface-layers of our cave if these had been carefully searched : for finds of this sort were made in the other caves, as I have mentioned above. I have heard of a polished stone axe said to have been found near the surface in the Barma-Grande ; but as

I have not seen it, and possess no accurate information about the depth at which it lay, I will not notice it further.

The cave-earth appears to have undergone a certain amount of disturbance in ancient times : for we find comparatively near the surface, implements strangely resembling those of the lowest layers. Fragments of breccia found at a level of 12, 15 and 18 feet above the layer of *Elephas antiquus*, and containing clumsy implements in gritstone, would seem to have been detached from the lower stratum. These pieces, none of them larger than a man's head, lay in the middle of a totally different deposit. We may perhaps account for this displacement by supposing that the cave-earth formed a talus sloping towards the entrance : thus the edge of the lower strata, projecting beyond the upper, would be easily accessible ; and we can understand how fragments containing implements of an earlier period might be carried back into the cave and become mixed with the deposits of a later age.

Are there any human remains in the layer characterised by *Elephas antiquus* and *Rhinoceros Merckii* ? This question is still unsolved, for that layer has been but partially explored as yet. However we may expect to come upon the remains of man himself at any time, since the weapons and implements found indicate that he inhabited the Barma-Grande at this

period. We know that human bodies were buried here during the reindeer age; for in 1884 M. Julien discovered a skeleton; in 1892 M. Abbo unearthed three more; and in 1894 he met with two others, one of which was completely charred. Thus it appears that these caves served not only as dwellings but also as burial places.

We have little information about M. Julien's discoveries; but we possess circumstantial details of the conditions under which the other skeletons were found. The three that were brought to light in 1892 had been buried in a trench the posterior wall of which was still distinctly visible. They lay 12 feet above the spot where the pelvis of an elephant was found. The last two were 5 feet 4 inches above the first, and about a yard from the present entrance of the cave. The others lay farther back.

It would seem that the position of the bodies was dictated by no funeral rites, for they lay some on the back, some on the side: sometimes the limbs were extended, sometimes more or less bent, and in certain cases the hands were brought up to the level of the chin. The skeletons lay either parallel to the longer axis of the cave or transversely.

A layer of ferruginous earth, brought from the neighbouring mountains, had been strewn at the botton of the first trench. On this the three bodies — a man a young woman, and a

youth — had been laid, and then covered with the same red earth. When decomposition had done its work, the peroxide of iron, coming into direct contact with the bones, coloured them, as it did also the various ornaments which had been buried with the bodies. This appears to have been a passing custom rather than a general habit.

It was formerly believed, and some archaeologists still affirm, that Quaternary man never buried the bodies of the departed. But the position of certain skeletons is a proof of the contrary : so also are the trenches, and the peroxide of iron often used. Again I have mentioned rudimentary stone tombs consisting of blocks set up on edge with a flat slab covering either the head or the feet. Lastly the skeletons were accompanied in every case by implements and ornaments, often very numerous, showing that the bodies had been interred adorned as in life with their choicest possessions : in fact, as we have seen, ornaments were found with every skeleton in the Barma-Grande.

The small perforated sea shells of the genus *Nassa* lying by the skull seem to show that a sort of head-band was habitually worn, in the meshes of which these shells were threaded. Canine teeth of deer perforated and often engraved with lines, (figs 12 to 15) and dainty bone pendants (figs 7 to 11) skilfully carved

and tastefully ornamented served to complete the effect of this headgear.

Necklets composed of shells, vertebrae of fish, or teeth of deer, sometimes with all these elements combined and symmetrically arranged, (fig. 19) were found by the neck of certain skeletons. One particular kind of pendant cut out of bone in the shape of a double olive and decorated with rows of little parallel scratches was picked up either on a level with the chest or near the hand.

Lastly there were perforated shells of the genus *Cypræa* lying on each side of the knees of one of the men. These had probably been attached to some sort of garter. The neighbouring caves yielded among other ornaments, bracelets, and shells (*Nassa neritea*) which were suspended from the waist in the form of a fringe.

Only one case of cremation has been met with. This skeleton had the legs doubled up with the feet close to the haunches. It lay quite at the back of the cave, on the same level as the fourth skeleton discovered by M. Abbo and behind it.

The men whose remains have been found in the caves of the Baoussé-Roussé fall into three different groups. The most ancient are negroid, indeed almost true Negroes. Their height is above the average, and the insertions of the muscles indicate that they possessed consider-

able strength. The relative length of the fore-arm and of the leg below the knee, the long lower limbs, the narrow pelvis with the iliae little sloped and the crests sinuous, and the lark heels ally them incontestably with the negro race. Other points of negroid affinity are the very long and narrow skull, the broad nose the wall of which ends in channels in front, the extremely prognathous jaws, the lower jaw at once narrow and elongated from front to back, the receding chin and the molars elongated in the antero-posterior direction and furnished with supplementary tubercles. The dentition of these negroids of Grimaldi even approaches that of the Australian aborigines, who are among the lowest of existing races.

The outline of the face, very broad at the level of the cheek-bones and narrowing below, reminds us of another negroid race of low developement, viz, the Bushmen.

But these men found in the Children's Cave had certain peculiar characteristics. The head is lacking in symmetrical proportions, the skull being elliptical, very long back and front, with a low and broad face. Behind the vertex the dome of the cranium shows a rather distinct flattening. The eye-orbits are not high but are much developed transversely. Lastly I would call particular attention to the excellent cranial capacity of these men, for the cranium is as well developed vertically as lengthwise.

Thus the negroid men of the Baoussé-Roussé present a strange mixture of high and low development. The limbs pelvis and face show signs of inferiority : but on the other hand the development and capacity of the cranium entitle them to an honourable place in the ranks of humanity.

The race which succeeded the negroid men and flourished during the greater part of the reindeer period is that of Cro-Magnon. It includes most of the skeletons found in the caves of the Baoussé-Roussé and all those of the Barma-Grande.

These men were of great stature, averaging six feet , some of them reached six feet seven inches. Their physical strength must have been equally remarkable : thus the muscles attached to the posterior edge of the femur were so powerful that the ridge marking their insertion forms an actual column behind the bone. The tibia shows that peculiar transverse flattening termed platycnemism : it is nevertheless as robust as the rest of the frame.

The head, of great capacity, has remarkable characteristics. Dolichocephalous races have usually a long face : the skull of the Cro-Magnons, on the contrary, like that of the earlier negroid men, was singularly lacking in symmetrical proportions, for while it was long in relation to its breadth, the face on the contrary was broad in relation to its height.

Viewed from above, the skull is in many cases rather pentagonal than elliptical in outline, a peculiarity due to the marked prominence of the parietal eminences; but this is a secondary character not met with in all individuals.

The profile presents the following peculiarities: the frontal curve is good and regular; so also is the anterior parietal curve. At the back the parietal bones are flattened, and this flattening is continued along the upper part of the occipital bone. Lower down the occipital bone has a sudden protuberance, then becomes flat again at the base.

I have drawn attention to the great breadth of the face: but this applies only to the upper and middle portions: the lower part, or maxillary region, on the contrary is considerably narrower. The superciliary ridges, which are very prominent near the nose, fall away and completely disappear outside. The eye-orbits are very wide and very low: they assume a rectangular shape, for the corners are barely rounded. The nose is prominent and rather narrow.

In some cases the upper jaw is slightly prognathous. In spite of their comparative narrowness, the jaws are remarkably powerful. We may notice lastly the triangular projecting chin and the worn condition of the teeth.

I have devoted special attention to the struc-

ture of the pelvis: the vertical diameters and especially its transverse diameters are remarkably wide. The iliae show the fine development and the regular curves which one finds in the men of modern Europe.

This race, so high in the scale of evolution, and in many ways so remarkable, had nevertheless retained certain traces of negroid affinity in the proportions of the limbs and the prominence of the heel. These few marks of inferiority may be regarded as traces of ancestral stucture.

We may conclude then that these tall men of the Baoussé-Roussé are the brothers of the reindeer hunters of South Western France. Like them they were troglodytes (cave-dwellers), and their handiwork, customs and mode of life were similar.

But it is open to question whether these stalwart men of the Barma-Grande and neighbouring caves lived here during Quaternary times. We know that the Cro-Magnon race was still well represented in France at the beginning of the polished stone age ; and they may have existed also near Mentone. From the fact that the first skeletons found by M. Abbo [that is to say those nearest the surface] were not associated with the remains of any animal truly characteristic of the Pleistocene period, and also from the absence of pottery and polished stone implements, I was led to the

conclusion that these men had lived during the transition between palaeolithic and neolithic times. Later on the new discoveries made since 1892 induced me to think that this race belonged to the latter part of the reindeer period. But the fresh evidence brought to light by le Chanoine de Villeneuve have compelled me to alter my views once more. For reasons explained above we must now accept the theory that the negroid men lived in the middle Pleistocene; and that towards the end of this period the Cro-Magnon race appeared, inhabiting the Children's Cave.

This race continued to live in this favoured corner of the Mediterranean coast during the reindeer age, since the remains of that animal have been found in the Barma-Grande on the same level as the human skeletons. Towards the end of this age there appeared another human type represented by a skeleton discovered in the upper layers of the Children's Cave. Owing to the bad state of preservation of this skeleton we are unable to ascertain the exact physical characteristics of the race to which it belonged.

No district is more interesting than that of the Baoussé-Roussé for the study of prehistoric man. We can follow his traces from the beginning to the end of the Pleistocene period. During this long stretch of time we witness the gradual improvement of his handiwork, and

from the Middle Pleistocene onward we can watch his physical development.

We are as yet unacquainted with the characteristics of the men who made the coarsely finished implements associated with the remains of a sub-tropical fauna. Possibly the Barma-Grande, which has furnished so much interesting information, will some day yield up from its secret depths the bones of the men who were contemporaneous with *Elephas antiquus* and *Rhinoceros Merckii* since it has not yet been thoroughly explored to the bottom. In this case we should have in this small corner of the globe an epitome of primitive humanity.

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